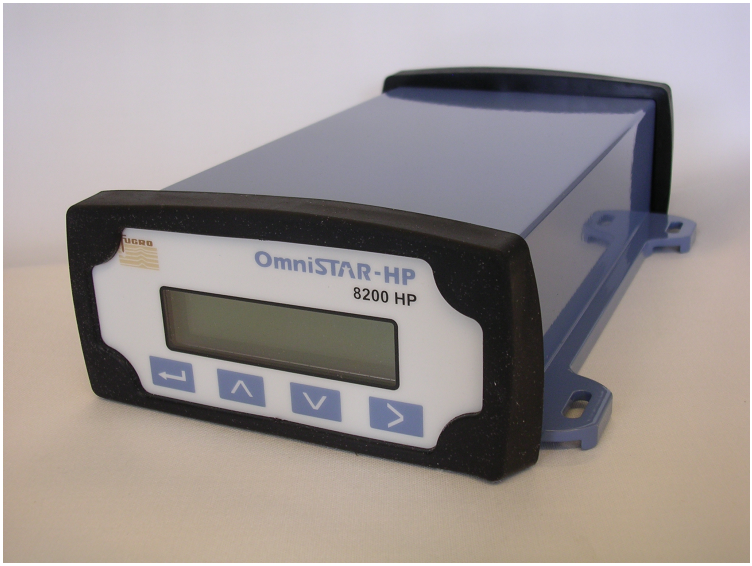
OmniSTAR 8200HP



User Manual

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Notice to Customers

This manual has been produced to ensure the very best performance from your OmniSTAR receiver. The manual has been clearly set out with simple instructions to ensure trouble free usage of your OmniSTAR receiver.

This publication could contain technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the manual.

Should you require further assistance please contact your local dealer or the OmniSTAR office.

OmniSTAR Customer Support and 24 Hour Help Line

The Netherlands:
OmniSTAR B.V.
Dillenburgsingel 69
2263 HW Leidschendam
The Netherlands
Tel: +31 70 317 09 00
Fax: +31 70 317 0919
Web : www.omnistar.nl
E-Mail: info@omnistar.nl

Australia:
OmniSTAR Pty Ltd
Tel: +61 8 9322 5295
Fax: +61 8 9322 4164
Web : www.omnistar.com.au
E-Mail: omnistar@omnistar.com.au

South Africa:
OmniSTAR Pty Ltd
Tel: +27 11 315 0420
Fax: + 27 11 312 1774
Web : www.omnistar.co.za
E-Mail: g.smith@omnistar.co.za

Singapore:
Fugro OmniSTAR Pte Ltd
Tel: +65 6542 5001
Fax: +65 6542 2208
E-Mail: sales@omnistar.com.sg

USA:
OmniSTAR Inc.
Tel: +1 713 785 5850
Fax: +1 713 785 5164
Web: www.omnistar.com
E-Mail: dgps2@omnistar.com

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Introduction

About This Manual

This manual has been produced to assist the typical user with the installation and operation of the OmniSTAR 8200HP DGPS Receiver.

System Features

The OmniSTAR 8200HP DGPS Receiver is part of the OmniSTAR world-wide DGPS Service. The OmniSTAR service is a full-time differential GPS (DGPS) broadcast system delivering corrections from an array of GPS reference stations located around the globe. Reference stations provide industry standard formatted corrections to Network Control Centres (NCC's) at strategic geographic locations, where the corrections are decoded, checked, and repackaged in a highly efficient format for broadcast. The data is modulated onto an RF carrier that is then up-converted for transmission to an L-band communications satellite.

The signals are received at the user's location by an antenna, demodulated by a receiver, and are made available, after selection of the desired individual reference site's data set, as corrections for use in a GPS, differential-capable, receiver.

The OmniSTAR 8200HP series of receivers support the following OmniSTAR® services:

HP, this is the High Performance service where dual frequency GPS carrier phase measurements are used in an intelligent and innovative way to create wide area positioning results of unmatched accuracy and performance.

XP, this is the Extended Position service where precise orbit and clock data is used to determine the position worldwide without using any reference stations.

VBS, this is the Virtual Base Station service where single frequency GPS code phase measurements are used to create RTCM corrections data optimised for the users current position.

Receiver Features

The OmniSTAR 8200HP receiver has the following features:

- 12 parallel GPS code/carrier tracking channels (L1 C/A-code and carrier, L2 carrier only)
- LCD front panel display
- Receiver configuration using the front panel
- Submeter differential accuracy (RMS), assuming at least five satellites and a PDOP (Position Dilution of Precision) of less than four (OmniSTAR VBS)
- Decimeter differential accuracy (OmniSTAR HP/XP)
- Low power consumption
- 1, 5, 10 Hz position output data (user selectable)
- Voltage and temperature monitoring and reporting
- A rugged, environmentally-sealed enclosure
- Everest™ multipath rejection technology
- Two combined power/data ports with Deutsch-brand connectors, supporting the following protocols:
  - CAN 2.0B:
    J1939 and NMEA 2000 messages (ISO 11783 compliant, supporting some ISO 11783 messages)
  - RS-232:
    NMEA-0183 output, RTCM SC-104 input and output, TSIP binary standard input and output protocol, ASCII input, CMR input (if enabled)
  - 1 PPS (Pulse per second) strobe signal to enable an external instrument to synchronize its internal time with a time derived from the very accurate GPS system time.
- GPS antenna port

Housing

The 8200HP is housed in an enclosure to provide a complete receiver solution. When connected to an antenna and a power source, the 8200HP is a fully functioning GPS/VBS/XP/HP receiver.

The enclosure offers protection against environmental conditions and RF interference. In addition, it provides an easy-to-use interface to the data, power and status signals of the GPS card and a rugged, water, shock and vibration resistant housing for outdoor applications.

Accessories

The following accessories are included with the 8200HP:

- 1 right angle combined power/data cable
- 1 GPS antenna type Z Plus
- 1 antenna cable (5 meters)
- 1 magnetic antenna mount
- A CD containing PC utilities and product documentation

Figure 1: 8200HP Back End

Name	Description
A	DC power input, RS-232 signals, CAN signals and auxiliary strobe signal
B	DC power input, RS-232 signals, CAN signals and auxiliary strobe signal
ANT	Antenna connection

Table 1: 8200HP Interfaces

Figure 2: Z+ antenna

Installation and Set Up

Installation Considerations

Before commencing installation of the OmniSTAR 8200HP in a vehicle or aircraft, the following should be considered:

- Determine the preferred location for each unit. Consider cable length, connector attachment space (cable bend radius), stowing excess cable, moisture, chemical corrosion, vibration and heat exposure.

- Before drilling holes, consider using existing hardware and locations where equipment was previously installed. Avoid drilling holes that may damage other equipment (e.g. structural frame members, electrical cables or fluid lines).

- High vibration and high temperature locations should be avoided whenever possible.

- In application where vibration exceeds 5Gs acceleration, shock mounts are required. (Refer to Customer support for mounting recommendations).

- Vehicle primary power has voltages that may be harmful to personnel and equipment. Disconnect the battery cable from the battery –Ve (negative) terminal before making connection to any power terminal within the vehicle.

Counter Electromagnetic Force (CEMF)

A potential problem inherent in any installation of electronic systems within a vehicle is Counter Electro-magnetic Force (CEMF).

CEMF is caused when relays or solenoids, connected to the vehicle DC power distribution, are de-energised. The voltage produced may exceed – 400 volts.

CEMF is produced by equipment such as the following:

- **Electric fan brakes**
- **Air conditioners**
- **Starter relays**
- **Electric pump relays**

CEMF is more than sufficient to damage or cause erratic operation of any electronic system that is also connected to the same vehicle DC power supply. CEMF can be eliminated by installing diodes at the relays and solenoids that cause the problem, and more importantly at the power supply cable connections on the receiver.

A 47V, 5W, Zener diode (1N5368 or equivalent) should be connected between the receiver +ve (positive) power input terminal and ground, as illustrated in Figure 3.

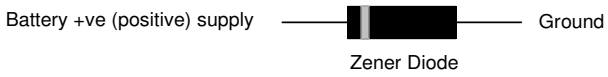


Figure 3: Zener Diode Connected

Cable Installation

Cables must be correctly installed for optimum system operation. Therefore, the following should be noted:

- Do not route an L-Band receiver remote antenna cable with the cabling of any other radio system. This may cause interference between both systems.
- If at all possible, do not run L-Band receiver antenna cables parallel to other radio system cabling closer than 30 centimetres.
- If cables must cross, ensure that they cross at an angle of 90°. This minimises the possibility of interference.
- As far as is practicable, ensure that cables and I/O connectors are unique and fit only in their allocated location.
- Avoid routing cables along-side power generator cabling and other high electrical noise sources. This can cause interference.
- Do not kink cables or force cables into sharp bends that may damage the cables and cause system failure.
- After installation, ensure that excess cable is looped and clamped or tied safely away from any control cables, fuel lines, hydraulic lines or moving parts.
- When stowing over length cabling, form loops not less than 150 mm minimum cable bend radius.
- Cable routing must avoid high temperature exposure (e.g. exhaust manifold).

Features and Information

This section contains information on the features of the 8200HP receiver.

Strobes

On the 8200HP, a set of outputs that provide status and synchronisation signals are given. These signals are called strobes. Access to the 8200HP strobe signals can be obtained through both data ports.

The strobe available on the 8200HP is the One Pulse Per Second (1 PPS) signal. The falling edge of this signal is synchronised with GPS time.

Receiver status

The 8200HP is equipped with an LCD display showing the status of the receiver. Using the display and the buttons around the display, the receiver can be configured without the need to connect a computer. The functions of the LCD display and the configuration menus are described further on in this manual.

Mounting the receiver

The 8200HP casing is equipped with four slotted mounting holes to facilitate mounting the receiver to a surface. This section provides information on how to mount the receiver.

Note: The receiver casing was not designed for mounting in high-dynamics or high-vibration environments.

To mount the 8200HP receiver:

1. Using the slotted holes as a template, drill four holes in the mounting surface.
2. Use screws to secure the casing to the mounting surface. When using machine screws, tap the mounting holes to fasten the receiver to the mounting surface. Alternatively, self-tapping screws can be used.
3. Make sure not to mount the receiver in a location where it can easily be damaged during normal operation. Try to protect the receiver against harsh environmental conditions.

Antenna Location

Antenna positioning is critical to system performance.

The following conditions must be met for optimum system performance:

1. Antenna must be mounted at least 1.5 metres away from transmitting antennas of any frequency. Closer positioning may cause overloading of receiver RF circuits.
2. The antenna should be mounted at the highest practical point that will give a good view of the horizon and be as near level as possible.
3. The antenna must be located along the vehicle centre-line, or at a relevant reference point on the vehicle.
4. The antenna should not be mounted in a location where it can easily be damaged during normal operation.

Power Supply Requirements

The 8200HP can be powered by a vehicle or by a customer-supplied power source of 10-32 VDC, capable of delivering at least 5W continuous output power. For continued protection against the risk of fire, the power lead to the 8200HP receiver should be provided with a 10 A (maximum) fuse.

Warning: Before powering the receiver, make sure the antenna cable and antenna are connected and the power/data cable is connected and secured. Connecting or disconnecting an antenna or antenna cable when the receiver is already powered may permanently damage the receiver's antenna port or the antenna itself, voiding your warranty. Connecting or disconnecting the power/data cable to/from the receiver when the cable is already powered may result in increased wear or an early failure of the power/data connector.

Warning: If the voltage supplied is below the minimum specification, the receiver will suspend operation. If the voltage supplied is above the maximum specification, the receiver may be permanently damaged, voiding your warranty.

Operating considerations

The 8200HP has proven to be a high-quality positioning device. The accuracy that the user can obtain depends on several factors, including:

- Number of visible satellites
- Multipath
- Dilution of Precision (DOP)
- Satellite elevations
- OmniSTAR corrections

Number of visible satellites

A minimum of four satellites is required to calculate a 3-dimensional position. In general it can be said that every increase in the number of visible satellites will result in an increase in the systems' accuracy. As the GPS satellites orbit the earth the number of visible satellites will change in time. The GPS constellation has been designed to provide a minimum of 4 visible satellites at any location at all times. The number of visible satellites can decrease due to blockage by objects such as trees and buildings.

Multipath

It is possible for satellite signals to reflect off large nearby objects such as buildings, cars or even the ground, thereby resulting in an erroneous distance measurement. This phenomenon is known as multipath. Multipath can cause significant errors in the position determination and it is therefore important to place the receiver in an environment, which is free of large reflective surfaces. It is also recommended to mount the receiver directly onto a surface, while maintaining a clear view of the sky in all directions.

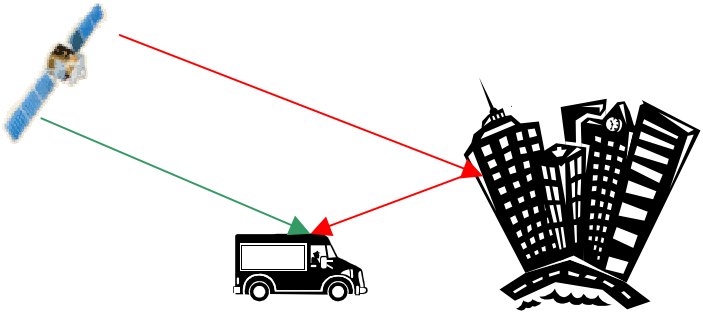


Figure 4: Multipath

Position Dilution of Precision (PDOP)

The Position Dilution of Precision (PDOP) is a measure of the satellite geometry. The closer to 1 the PDOP value, the more accurate the GPS position will be.

Satellite elevations

The signal from a satellite that is low on the horizon will travel a greater distance through the atmosphere. This results in a lower signal strength and a delayed reception, thereby causing erroneous and noisy data. By default the 8200HP is configured to ignore any GPS satellites that have an elevation angle lower than 5° for VBS and lower than 8° for HP.

OmniSTAR corrections

For accurate positioning it is essential that the differential corrections are received. In order to ensure reception of the OmniSTAR satellite signal the line of sight towards the satellite must not be blocked by objects such as trees and buildings. To find out which OmniSTAR satellite(s) can be received at your geographic position, please visit the surveyplanner website (http://www.surveyplanner.com/).

Interference

Although the 8200HP has been designed to provide optimal system performance under most circumstances, due to the nature of radio communications it is possible, that the system performance degrades as a result of local interference sources. When interference levels are too high, the 8200HP may even lose lock to either the OmniSTAR satellite or the GPS satellites.
Interference sources include radio and television transmitters, radars, microwave ovens, poorly shielded spark plugs and aeronautical radionavigation systems, in short: any device producing electromagnetic energy (directly or through harmonic frequencies) in the 1525 - 1580 MHz band.

Operation

Before operating the receiver for the first time, ensure that you follow the following installation instructions.

1. Mount the 8200HP receiver in a suitable place (see also page 9).
2. Mount the OmniSTAR antenna in a suitable place (see also page 10).
3. Connect the antenna cable to the antenna and the receiver, making sure the right angle connector is connected to the antenna. Secure the antenna cable using tie wraps.
4. Connect the data/power cable to port A of the 8200HP receiver. If desired, also connect the data connector (9 pin sub D connector).
5. Connect the power leads to a suitable (10-32 V DC) power supply.

Getting Started

The purpose of this section is to get you started with the 8200HP as quickly as possible. The guide will address receiving the satellite data carrier, and then checking the functionality and status of the HP Process.

Generally, when the receiver is supplied to you it will be configured for the mode and data link(s) you have subscribed to. In most cases getting up and running will be a case of connecting the appropriate cables and applying power to the system.

Communicating with the Receiver

Communicating with the receiver is possible using the receiver's front panel and LCD screen, the AgRemote program on a Microsoft Windows-based computer or Viewall on a PDA. The AgRemote program will communicate with the 8200HP through a standard serial port using the TSIP-protocol. AgRemote will copy the front panel interface (LCD screen and buttons) to your desktop, providing you with a familiar interface when the receiver's front panel is hard to reach. Because the 8200HP's display is small, the receiver uses a number of menus and submenus to access all of the receiver's possible information and configuration screens.

Starting the Receiver

The receiver's software resides in read-only memory. As such, the unit "self-boots" when turned on and undergoes a complete self-test. When the receiver is first turned on, it will show the following boot sequence:

- **Starting Up** (followed by a progress indicator bar on the second line of the display)

- **EHES** (followed by a progress indicator bar on the second line of the display)
- **Starting Up** (followed by a progress indicator bar on the second line of the display)
- **Launch[GD]**
- **Launch[HP]**
- **Launch[CN]**
- **Launch[Go]**
- **8200HP**
  (C)1997-2003 TNL
- **8200HP**
  P/N 55581-30[1]
- **8200HP**
- **Version: 3.10**

The Receiver Home screen

Upon booting successfully, the receiver will show the Home screen. The top row of the Home screen will show GPS status indicators, the bottom row of the Home screen will show Satellite DGPS indicators. Figure 5 shows a possible Home screen for a receiver with an activated OmniSTAR HP subscription.

Figure 5: Home screen when OmniSTAR HP corrections are received

The following information is shown:

H|3D: Position type. H|3D means the receiver is outputting a converged OmniSTAR HP differential position. When the receiver is operating correctly, the | symbol spins. Possible position types are listed in Table 2.

$^{S}_{V}$06: Number of satellites the receiver is tracking (00 – 12). A minimum of four satellites is required for a valid position calculation.

DOP03: The current Position Dilution of Precision value. The closer to 1, the better, so 3 is fairly good. A DOP of 00 indicates the receiver has no GPS position solution yet.

[1] The product number (P/N) indicated on the screen should correspond to the product number found on the sticker on the bottom of the receiver housing.

A: 4cm: Differential information. A: 4cm gives the estimated position error (1 sigma) in HP/XP mode. Possible values for this field are shown in Table 3.

EASAT: The receiver is using differential corrections broadcast by the EASAT satellite.

$^{S}/_{N}$09: The signal to noise ratio of the DGPS signal. Signal to noise values below 4 indicate an unusable signal, signal to noise values between 4 and 8 indicate a fair signal strength and signal to noise values higher than 8 indicate an excellent signal strength. This field will show 'Srch' when the selected DGPS satellite is not yet tracked or 'Trck' when the selected satellite can be tracked but the receiver has not yet started to collect data from the satellite.

Display	Description
SRCH	Searching for satellites
TRCK	Tracking satellites
G|2D	Outputting 2-dimensional autonomous positions
G|3D	Outputting 3-dimensional autonomous positions
D|2D	Outputting 2-dimensional differential positions
D|3D	Outputting 3-dimensional differential positions
x|3D	Outputting unconverged OmniSTAR XP differential positions
X|3D	Outputting converged OmniSTAR XP differential positions
h|3D	Outputting unconverged OmniSTAR HP differential positions
H|3D	Outputting converged OmniSTAR HP differential positions

Table 2: Position types

Display	Description
NoSgnl	The signal of the selected satellite is too weak to be received, or the wrong differential satellite has been selected.
Updtng	The receiver is updating its almanac data from the selected satellite
Om-VBS	The receiver has valid OmniSTAR VBS data and is set to VBS mode only.
Static	The receiver has detected it is stationary and is using this information to aid the convergence of the position.
A:xxx	The estimated position error (1 sigma) of the HP/XP position solution (meters/feet or centimeters/inches).
B:AUTO	Backup differential mode is set to automatic (only possible when the receiver is in HP/XP mode).
B: VBS	Differential mode falls back to VBS in case HP/XP mode should fail (only possible when the receiver is in HP/XP mode)

Table 3: Differential information

The 8200HP menu structure

The menu structure of the 8200HP consists of 3 top-level menu screens. Each top-level menu screen links to one or more sub-menu screens. Each sub-menu screen links sequentially to a number of information/configuration screens. Cycling through the top-menu screens is done by pressing the button repeatedly. The order of the top level menu is Home screen – Status screen – Configuration screen – Home screen.

Pressing the button from one of the top-level menu screens will enter the corresponding sub-menu. Cycling through the sub-menu screens of a certain sub-menu is again done by pressing the button repeatedly. To return to the top-level menu screen, press the button.

The information/configuration screens under a certain sub-menu can be accessed by pressing the button. To cycle through the screens, use the and buttons. In some screens, information can be edited. These screens show a small 'CFG' in the top left corner of the screen. To enter edit mode, press until the cursor blinks on the first character of the information to be edited. To leave edit mode, press . Other screens can show more information than fits the screen. These screens show a small '↵' sign in the top

left corner. To cycle through the underlying information screens, press repeatedly.

This section of the manual will describe the 8200HP's menu structure and screens.

Top-level: home
The home screen is the receiver's default screen after a successful receiver boot. The information on the home screen has already been described in detail on the previous pages of this manual. From the home screen, the sub-menu 'Display Options' can be accessed.

Top-level: Status

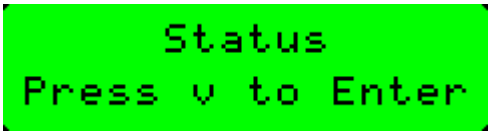


Figure 6: Status screen

The status screen provides access to four sub-menus. Pressing from the Status screen will enter the ' GPS Status' sub-menu screen. Starting from the GPS status screen, pressing repeatedly will enter the DGPS Status screen, the Receiver Status screen and the CAN Status screen.

Top-level: Configuration

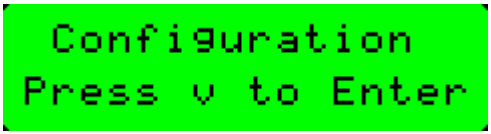


Figure 7: Configuration screen

The configuration screen provides access to seven sub-menus. Pressing from the configuration screen will enter the 'GPS configuration' sub-menu screen. Starting from the GPS configuration screen, pressing repeatedly will enter the DGPS configuration screen, the Port A configuration screen, the Port B configuration screen, the Port C configuration screen, the CAN A configuration screen and the CAN B Configuration screen.

Sub-menu: Display Options
In the Display Options menu, the following information and configuration items can be found. Items are listed in order, cycling through items can be done by pressing the or buttons.

Contrast

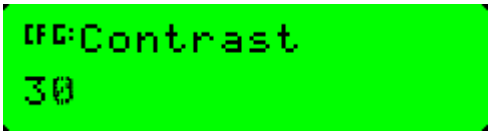


Figure 8: Contrast screen

Contrast is a configuration item. Using this screen, the contrast of the receiver's LCD screen can be increased or decreased. Default value is 30.

User Level

Figure 9: User level screen

User level is a configuration item. Using this screen, the level of experience of the user can be set. Possible values are 'advanced' (default) and 'beginner'. When 'Beginner' is selected, the configuration menus are no longer displayed when navigating the menus.

Lock Display

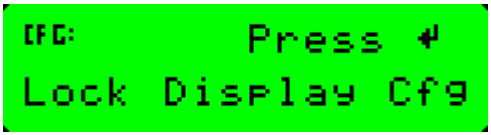


Figure 10: Lock Display screen

To prevent unauthorized changes to the receiver configuration, the configuration menus can be locked using this screen. To activate the lock, press ↵ to display the *Enter Password* screen.

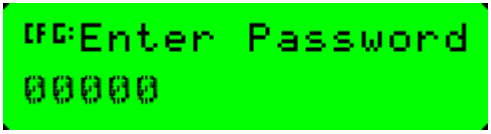


Figure 11: Lock Display - Enter Password screen

The cursor blinks on the first digit. Enter the receiver password, which is equal to the last five digits of the serial number of your receiver. The value of the active digit can be changed by pressing or . The next digit can be selected by pressing . When all five digits have been entered, press to save the changes. The **Valid Password** message should appear and the Configuration menus are no longer displayed when navigating the menus.
If the message **Invalid Password** appears, enter the password again. To unlock the Configuration menus, repeat the above procedure.

Language

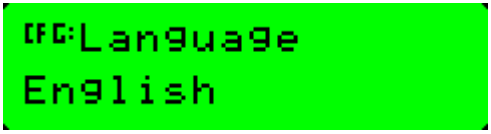


Figure 12: Language screen

Using the Language screen, the receiver's menu languages can be set. Default setting is English. Other options are French, German, Spanish, Portugese and Argentine Spanish.

Units

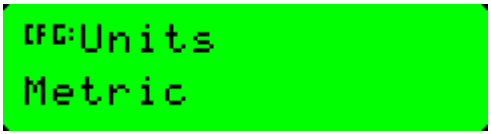


Figure 13: Units screen

Using the Units screen, the units used by the receiver to present position accuracy and speed can be set. Default is U.S. (feet/inches/mph). Other options are metric (meters/centimeters/kph) and Nautical (feet/inches/kts).

SNR Units

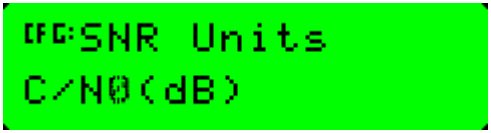


Figure 14: SNR Units screen

The SNR Units screen is used to configure the units representing the signal to noise ratio of the received signal. Default is C/N0 (dB). The other option is AMU.

Clear BB RAM

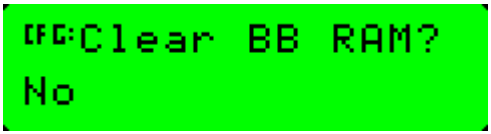


Figure 15: Clear BB RAM screen

The Clear Battery-backed RAM screen is used to remove all configuration settings in the receiver memory (RAM) and return the receiver to its factory default configuration settings. Existing OmniSTAR subscriptions are not erased from the receiver's memory.

Update Receiver

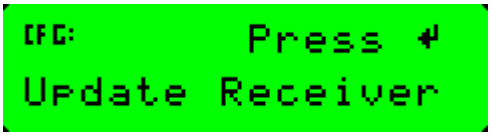


Figure 16: Update Receiver screen

It is possible to purchase options with the 8200HP receiver. To unlock these options, a password is required, which can be provided by your OmniSTAR reseller. Using the Update Receiver screen, the password can be entered.

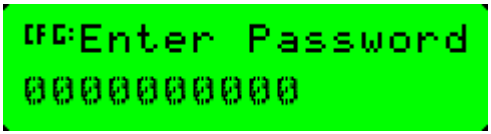


Figure 17: Update Receiver - Enter Password screen

Once entered, the password is stored in permanent memory and remains even when the receiver is switched off.

Sub-menu: GPS Status

In the GPS Status menu, the following information items can be found. Items are listed in order, cycling through items can be done by pressing the or buttons.

Lat/Long

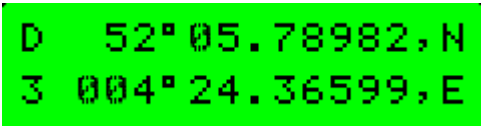


Figure 18: GPS Lat/Long screen

The Lat/Long screen shows current GPS position (Latitude and Longitude) along with the status of the position solution on the left side of the display (**G**PS or **D**GPS, **2**-D or **3**-D)

Altitude

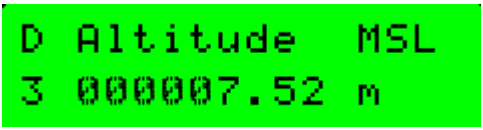


Figure 19: GPS Altitude screen

The Altitude screen shows the current altitude of the antenna above mean sea level. This screen, like the Lat/Long screen, also shows the status of the position solution on the left side of the display.

Speed/Heading

Figure 20: GPS Speed and Heading screen

The speed and heading screen shows current speed and heading with reference to true north of the vehicle carrying the 8200HP. When the 8200HP is used in static mode, the information in this screen has no meaning except for the status of the position solution.

Channel Status

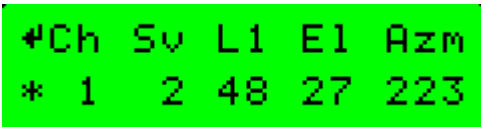


Figure 21: GPS Channel Status screen

The GPS Channel status screen shows the status of all 12 receive channels of the 8200HP. The channels can be cycled by pressing repeatedly. The information shown (from left to right) is the receiver channel number, the satellite SV number tracked by this channel, the signal to noise ratio on the L1 and L2[1] frequency (the 'L1' text on the top row can also be 'L2' when a certain satellite is tracked on the L2 frequency), the elevation of the satellite (angle above the horizon) and the azimuth of the satellite tracked ('compass angle' from the user's position towards the satellite). The asterisk in front of a channel number indicates the satellite is being used to calculate the receiver's (D)GPS position. When a channel is not used for satellite tracking, instead of signal to noise ratio, elevation and azimuth values, either 'Searching' or 'Idle' is shown.

DOP values

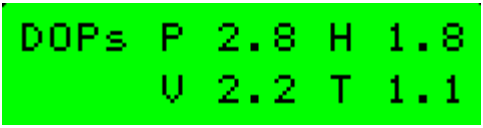


Figure 22: GPS DOP values screen

The DOP values screen shows the four different DOP (Dilution of Precision) values calculated by the GPS receiver: PDOP (position), HDOP (horizontal), VDOP (vertical) and TDOP (time). DOP values are an indication for the quality of the position solution. Ideally, each DOP value should be one. The closer to one, the better.

Sub-menu: DGPS Status

In the DGPS Status menu, the following information items can be found. Items are listed in order, cycling through items can be done by pressing the or buttons.

[1] L2 tracking only in HP/XP mode

Sat Tracking

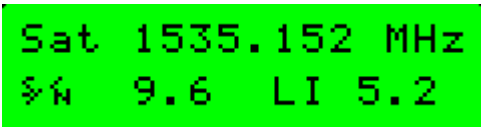


Figure 23: DGPS Sat Tracking screen

The Sat Tracking screen shows information about the satellite used for DGPS corrections (HP or VBS). The screen shows the frequency of the selected satellite (the example in Figure 23 shows the frequency of EASAT), the signal to noise ratio and the lock indicator. The lock indicator can be used to determine if the receiver has a good signal lock to the satellite. A higher LI value is normally better.

Service ID

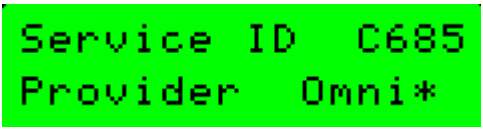


Figure 24: Service ID screen

The service ID screen shows information (satellite uplink identifier and provider name) about the DGPS service provider.

DGPS data source

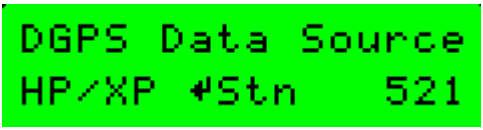


Figure 25: DGPS Data Source screen

The DGPS Data Source screen shows the identification numbers of the OmniSTAR reference stations used to calculate the differential corrections for the 8200HP at its current location. To scroll through the list of reference stations, press ↵ repeatedly. Station ID 9999 indicates use of XP.

Age of DGPS/Sync

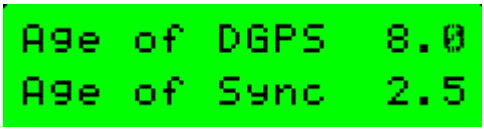


Figure 26: Age of DGPS/Sync screen

The Age screen shows the age of the differential data (in seconds) and the time elapsed since the last valid differential correction received by the 8200HP (Age of Sync). Because it takes some time to calculate differential corrections at the reference station and broadcast these corrections to the 8200HP, the smallest DGPS age will always be a few seconds.
Because the validity of a differential correction depends on the difference between the time the differential signal is calculated and the time it is used by the receiver, smaller values are better.

VBS Info

The VBS info screen consists of 7 different information screens, that can be cycled through by pressing ↵ repeatedly.

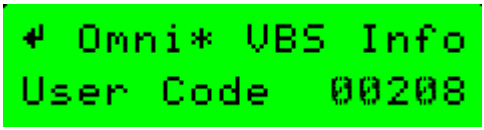


Figure 27: VBS Info screen: User Code

The User Code screen shows the receiver's User Code, which is equal to the last five digits of the serial number of the receiver.1+Usercode gives the OmniSTAR serialnumber needed to activate the receiver. So 100208 in above example.

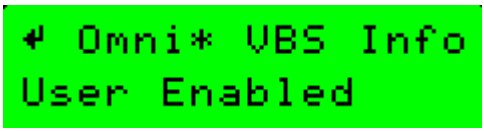


Figure 28: VBS Info screen: User Enabled

The User Enabled screen shows whether or not the receiver is activated to receive OmniSTAR differential corrections.

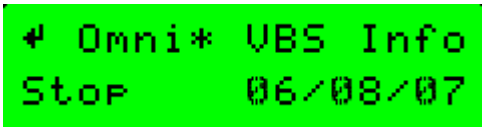


Figure 29: VBS Info screen: Stop

The Stop screen shows the expiration date of the current OmniSTAR subscription (mm/dd/yy format). The receiver will stop working in differential mode when the stop date has been reached or exceeded.

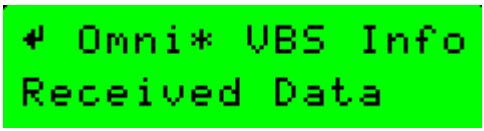


Figure 30: VBS Info screen: Received Data

The Received Data screen shows whether or not the 8200HP has received all necessary information from the OmniSTAR satellite to calculate a VBS position. If this screen shows 'Init dec' instead of 'Received Data', either the 8200HP is still downloading time, position, almanac or site table data (each of these is indicated by a '-' or an 'X' symbol in the lower right hand corner of the screen) or the antenna (cable) has failed or is not connected.

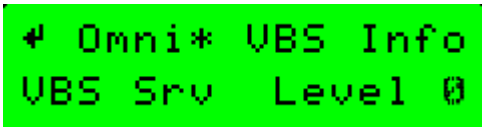


Figure 31: VBS Info screen: VBS Service Level

VBS service level is not used anymore. It should always be zero.

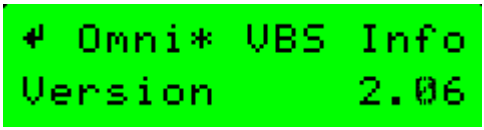


Figure 32: VBS Info screen: VBS version

The VBS Version screen shows the VBS firmware version currently loaded in the receiver.

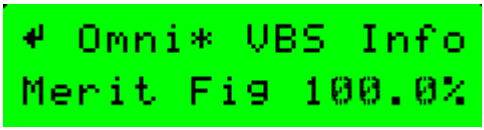


Figure 33: VBS Info screen: Figure of merit

The Figure of Merit is a quality indicator. It shows the ratio of packages received with an invalid checksum and packages received with a valid checksum over the last couple of measurements The closer to 100%, the better.

XP/HP Info

The XP/HP info screen consists of 7 different information screens, that can be cycled through by pressing ↵ repeatedly.

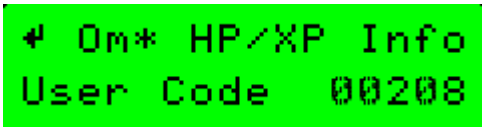


Figure 34: HP/XP Info screen: User Code

The User Code screen shows the receiver's User Code, which is equal to the last five digits of the serial number of the receiver.

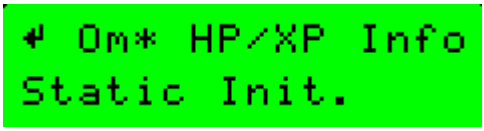


Figure 35: HP/XP Info screen: Initialisation

The initialisation screen shows whether or not the receiver is put in static initialisation mode. When the receiver detects it is stationary, static initialisation mode is selected to aid HP/XP convergence. In static initialisation mode, convergence can be up to 50% faster than in dynamic (i.e. the receiver is moving) initialisation mode.

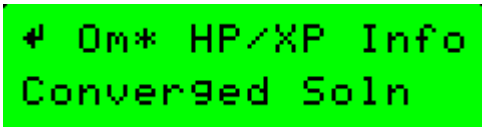


Figure 36: HP/XP Info screen: Solution convergence

The Solution Convergence screen shows whether or not the HP/XP solution has already converged to within the set convergence limits (see also the corresponding configuration screen, described further on in this manual).

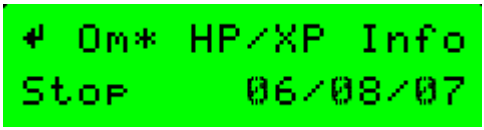


Figure 37: HP/XP Info screen: Stop

The Stop screen shows the expiration date of the current OmniSTAR subscription (mm/dd/yy format). The receiver will stop working in differential mode when the stop date has been reached or exceeded.

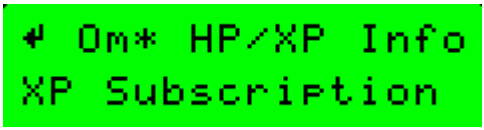


Figure 38: HP/XP Info screen: Subscription type

The Subscription type screen shows the receivers current high-precision mode (XP or HP). When the receiver is working in HP mode, the screen will show 'HP Subscription'. When the receiver is working in HP+ or XP mode, the screen will show 'XP Subscription'. Since HP only activations are not used anymore (HP has been upgraded to HP+), this screen will always show 'XP Subscription', even when the receiver has been activated HP+. Check the Subscription Mode screen (see below) to see the real subscription type.

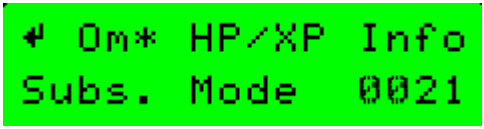


Figure 39: HP/XP Info screen: Subscription mode

The Subscription mode screen shows the current high-precision DGPS mode of the receiver in more detail than the Subscription type screen (described above). Refer to Table 4 to determine the subscription type. The entries marked 'converged' are the values shown in the display when convergence of the position solution has been reached. Note that the table may not be complete: when other special options for the receiver are set, the values may differ.

Subs. Mode	Description
000A 000B (converged) 000C	XP only mode
0014 0016 (converged) 0017	HP only mode
001E 001F 0020 0021 (converged)	HP/XP combined mode (HP+)

Table 4: XP/HP Subscription types

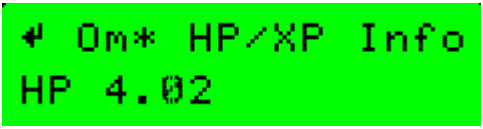


Figure 40: HP/XP Info screen: HP version

The HP version screen shows the HP firmware version currently loaded in the receiver.

Srvc ID

The Srvc ID screen consists of 2 information screens, that can be cycled through by pressing repeatedly.

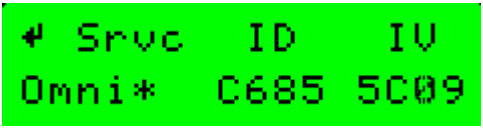


Figure 41: XP/HP Info screen: Srvc ID screen 1

The Service ID screens show information about the OmniSTAR satellite uplink and initial uplink vectors. Shown in Figure 41 are the satellite uplink ID and initial vector for the Europe uplink.

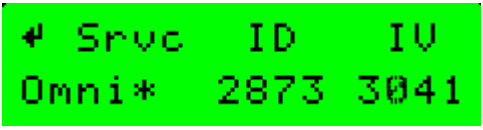


Figure 42: XP/HP Info screen: Srvc ID screen 2

The second service ID screen, shown in Figure 42, shows the satellite uplink ID and initial vector for the US/Australia uplink.

Sub-menu: Receiver Status
In the Receiver Status menu, the following information items can be found. Items are listed in order, cycling through items can be done by pressing the or buttons.

UTC Time/Day

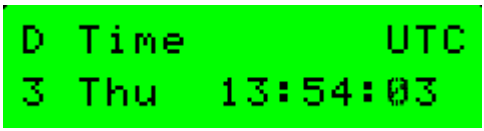


Figure 43: UTC time and day

The UTC time and day shows the current UTC-time and day of the week

UTC Date GPS Week

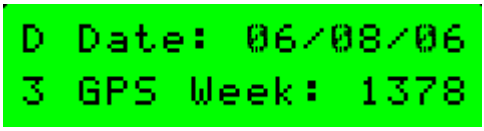


Figure 44: UTC date and GPS week

The UTC Date and GPS Week screen shows the current UTC-date (mm/dd/yy format) and GPS week number.

Serial Number

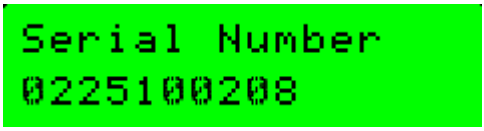


Figure 45: Receiver serial number

The Serial number screen shows the receiver serial number. This serial number should correspond to the serial number printed on the sticker on the bottom of the receiver case.

Firmware Version

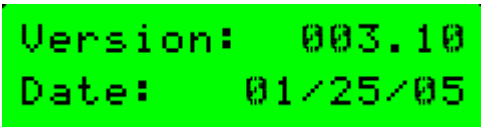


Figure 46: Receiver firmware version

The Firmware version screen shows the receiver firmware currently loaded in the receiver and the date this particular firmware version was released.

Receiver Options

The Receiver Options screen consists of 13 different information screens, that can be cycled through by pressing ↵ repeatedly. Each information screen shows a certain option that can be either marked available (A) or unavailable (U). Some information screens will also show the current setting of a certain option.

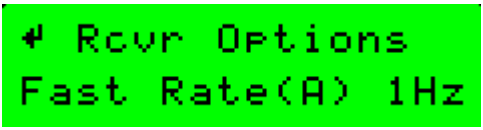


Figure 47: Receiver Options: Fast Rate

The Fast Rate screen shows whether or not the receiver is capable of outputting its position at a fast rate (up to 10 Hz) and the current setting of the position output rate. Figure 47 indicates the receiver is capable of outputting the position at a fast rate, while the current setting is 1Hz. Other possible settings are 5Hz and 10Hz.

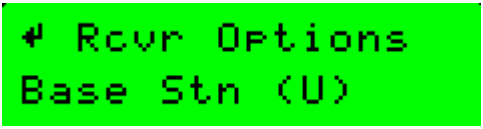


Figure 48: Receiver Options: Base Station

The Base Station screen shows whether or not the receiver is capable of serving as an RTK base station.

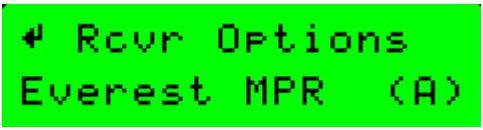


Figure 49: Receiver Options: Everest Multipath Rejection

The Everest MPR screen shows whether the Everest Multipath Rejection technology is implemented in the receiver.

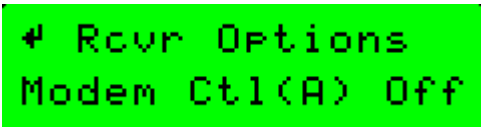


Figure 50: Receiver Options: Modem Control

The Modem Control screen indicates whether or not one of the communication ports has been configured to use the RTS/CTS signals in communication with a connected device. Default, RTS and CTS are not used on either of the communication ports.

Figure 51: Receiver Options: D&E Sub

Legacy screen , currently not used anymore

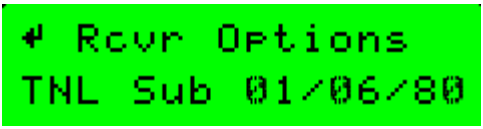


Figure 52: Receiver Options: TNL Sub

Currently not used anymore

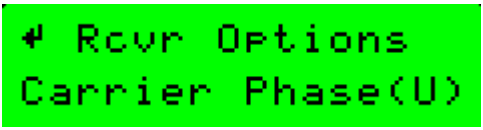


Figure 53: Receiver Options: Carrier Phase

The Carrier Phase screen shows whether or not the receiver is capable of processing carrier phase differential corrections broadcast by an RTK base station.

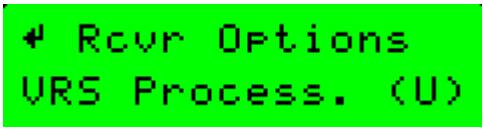


Figure 54: Receiver Options: VRS Processing

The VRS (Virtual Reference Station) option allows the user to operate the receiver within an RTK network.

Figure 55: Receiver Options: Tilt Sensor

The Tilt Sensor screen shows whether or not the receiver is capable of processing information from a tilt sensor, in order to compensate for the position errors caused by a high mounted receiver used on a non-level surface (see Figure 56).

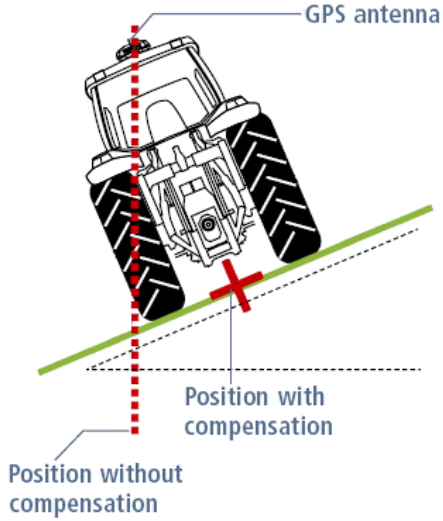


Figure 56: Position error caused by a tilted, high-mounted receiver antenna

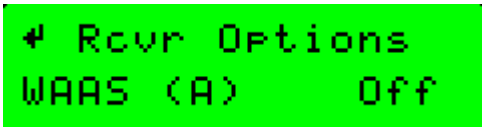


Figure 57: Receiver Options: WAAS

The WAAS screen shows whether or not the receiver is capable of receiving and processing WAAS, MSAS and EGNOS signals and whether or not the receiver is currently using either WAAS, MSAS or EGNOS corrections.

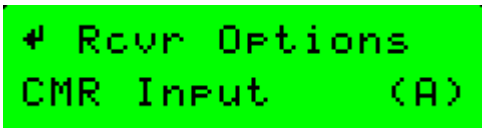


Figure 58: Receiver Options: CMR Input

The CMR Input screen shows whether or not the receiver is capable of processing CMR messages. CMR is a message format used in RTK mode. In order to be able to receive CMR messages, the data port connected to the RTK radio receiver should be set to the RtkLnk protocol.

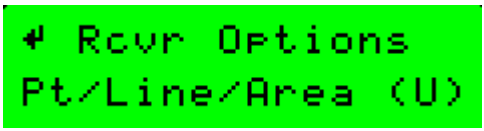


Figure 59: Receiver Options: Point/Line/Area

This option allows the user to navigate DGPS-aided to a point or along a line or a circular area.

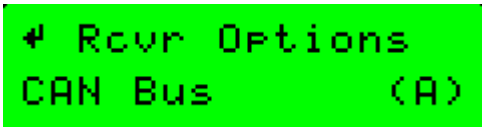


Figure 60: Receiver Options: CAN Bus

The CAN Bus screen shows whether or not the receiver is capable of supporting the CAN (Controller Area Network) bus protocol.

System Voltages

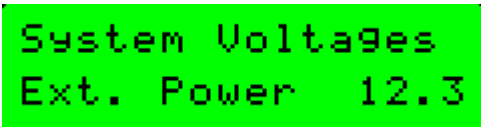


Figure 61: System voltages

The System Voltages screen shows the current power supply voltage of the receiver.

System Temp

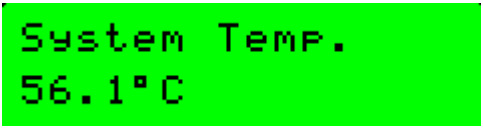


Figure 62: System temperature

The System Temp screen shows the current temperature inside the receiver case. This temperature is normally higher than the real (ambient) temperature, as the receiver board itself produces some heat when it is switched on.

Incident Code

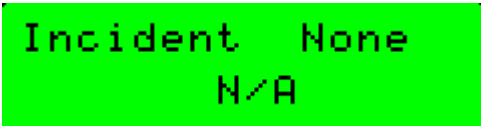


Figure 63: Incident code

The Incident Code screen shows the code of the last occurred receiver incident. Incidents are circumstances causing the receiver to malfunction or not function correctly.

Sub-menu: CAN Status

In the CAN Status menu, the following information items can be found. Items are listed in order, cycling through items can be done by pressing the or buttons.

J1939 Addr. Claim Ch A

Figure 64: J1939 Address Claim Channel A

As the CAN bus protocol allows a number of devices to communicate with each other over the same two-wire data bus, there needs to be a way to address the messages in order to let them reach their destination. Therefore, all devices connected to the CAN bus get a unique address. The Addr. Claim screen shows whether the receiver was successful in obtaining a CAN bus address.

J1939 Addr. Claim Ch B

Figure 65: J1939 Address Claim Channel B

As above, but for the second communication port. Since it is possible to connect both channels of the receiver to one CAN bus or each channel to a different CAN bus, the channel B address may be different from the channel A address.

ChA TPCAN Conns

Figure 66: Channel A TPCAN Connections

The TPCAN connections screen shows a list of other devices connected to the same CAN bus as the 8200HP on channel A. To cycle through the different

screens (when more devices are connected than can be listed on one screen), press ↵ repeatedly.

ChB TPCAN Conns

Figure 67: Channel B TPCAN Connections

As above, but for the second communication port.

Sub-menu: GPS Config

In the GPS Config menu, the following configuration items can be found. Items are listed in order, cycling through items can be done by pressing the ∨ or ∧ buttons. Selecting the item to change is done by pressing the > button (repeatedly, if necessary). To confirm all changes, press ↵ once.

Restore GPS Defaults

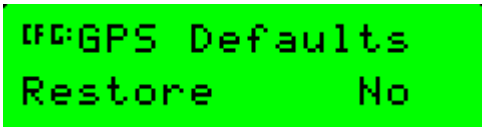


Figure 68: Restore GPS Defaults

Using the Restore GPS Defaults screen, the GPS configuration settings can be restored to their default (factory-set) values. Possible options are 'Yes' and 'No'.

GPS Mode

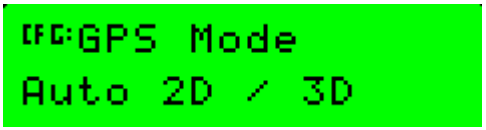


Figure 69: GPS Mode

The GPS mode screen is used to change the receiver's positioning behaviour. Default is Auto 2D/3D mode, in which the receiver switches to a 2D position automatically when only 3 GPS satellites can be received and back to a 3D position when four or more GPS satellites can be received.

Other options are Manual 2D (always a 2D position, 3 or more GPS satellites required) and Manual 3D (always a 3D position, 4 or more GPS satellites required).

System Masks

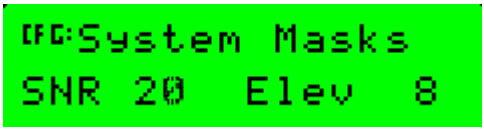


Figure 70: System Masks

The system masks control whether or not the receiver will use a certain GPS satellite for its position calculations. Since the signals of low-elevation satellites have a larger distance to travel, the signals of those satellites will be weaker and may cause a larger position error than the signals of satellites at higher elevations. Default, all satellites with a signal to noise ratio of 37dB or less and all satellites with an elevation below 8 degrees will not be used in the position calculations. Valid SNR values lie between 10 and 60, valid Elev values lie between 0 (satellite at horizon) and 90 (degrees).

PDOP Settings

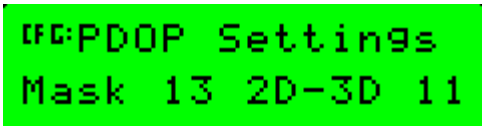


Figure 71: PDOP Settings

The PDOP Settings screen controls the PDOP value for which the receiver will switch between 2D and 3D positioning, even if enough GPS satellites are in view. In the above screenshot, the receiver will fall back to 2D positioning when the PDOP exceeds 11. 'Mask' indicates the PDOP value above which the receiver will stop calculating a GPS position. A large PDOP value (> 8) normally indicates bad signal reception and hence a large position error.
Mask values and 2D-3D values both lie between 1 and 99. Keep in mind that only a mask value larger than the current 2D-3D value makes sense if the 8200HP is to show 'graceful degradation' of the position solution (i.e. 3D – 2D – no position solution).
Default values are Mask: 13, 2D-3D: 11.

PV Filter

Figure 72: Position Filter

A position filter is an aid in smoothing the position output. Using a filter, position glitches are smoothed by either checking the measured position against a predicted position based on previous positions and velocities or by applying a band pass filter, effectively limiting how much a position is allowed to change between two subsequent position calculations. The smoothing effect of the filter depends on the kind of filter and the amount of filtering ('strength' of the filter). Possible filter values are PV (Position/Velocity) and BF (band pass filter). Using band pass filtering, the only filter options are 'disable' and 'enable' (use filtering or not). Using PV filtering, the filter options are Off (no filtering), Dyn (dynamic filtering) and D+S (dynamic+static filtering). The filter levels are Norm, High and Max.
By default, the position filter is set to PV, normal level and no filtering.

CC Filter

Figure 73: Carrier Code Filter

The 8200HP can use the GPS carrier information to remove noise from the code information, thus improving system performance. Options for the C.C. filter are 'Reset Filt(New)' and 'Propagate (Old)'.

Position Rate

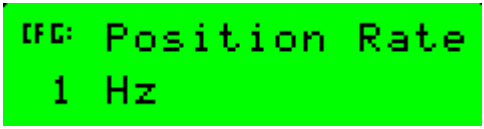


Figure 74: Position Rate

In the Position Rate configuration screen, the position calculation rate can be set. Options are 1, 5 and 10 Hz. Setting the rate to 5 or 10 Hz does not automatically change the position output rate to 5 or 10 Hz. To get a 5 or 10 Hz position output, the corresponding communication port also has to be

configured to output the NMEA/TSIP messages at a higher rate (see page 47 of this manual). Default setting of the position rate is 1 Hz.

Dynamic Mode

Figure 75: Dynamic Mode

The receiver can be configured for use in different dynamic modes. Each dynamic mode directly influences the filter settings (see also page 38 of this manual). Possible values are Static, Land (default value), Sea and Air.

GPS Diags

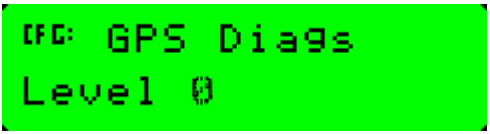


Figure 76: GPS Diagnostics

GPS diagnostic levels are only used in rare occasions by the manufacturer support team. Different diagnostic levels can provide additional information from the satellite and/or differential source being used. Values for GPS Diags Level range from 0 to 15. Default setting is zero. This value shall not be changed, unless otherwise instructed by qualified support personnel.

Sub-menu: DGPS Config

In the DGPS Config menu, the following configuration items can be found. Items are listed in order, cycling through items can be done by pressing the or buttons. Selecting the item to change is done by pressing the button (repeatedly, if necessary). To confirm changes, press once.

DGPS Source

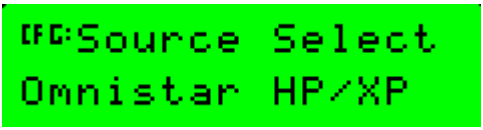


Figure 77: DGPS Source Select

Using the Source Select screen, the primary source of DGPS correction signals can be set. Valid options are 'OmniSTAR HP/XP' and 'OmniSTAR

VBS'. Mind that, although it is always possible to select OmniSTAR HP/XP or OmniSTAR VBS as the primary source of DGPS corrections, a valid OmniSTAR subscription is required to have the receiver output a DGPS position.

Backup Source

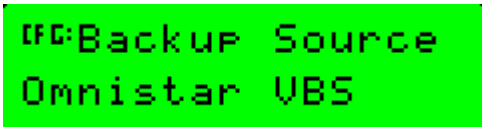
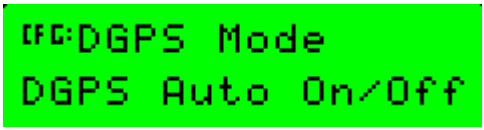


Figure 78: DGPS Backup Source Select

When the primary source of DGPS corrections is OmniSTAR HP/XP, OmniSTAR VBS can be set as backup source of DGPS corrections in case HP/XP should fail or be unavailable. Valid options are 'OmniSTAR VBS' and 'None'. Since HP/XP subscriptions usually come with a complimentary VBS signal, it is strongly advised to set the DGPS backup source to OmniSTAR VBS if your primary DGPS source is OmniSTAR HP/XP.

DGPS Mode



The DGPS mode screen can be used to control the output behaviour of the receiver. In DGPS Auto On/Off mode (default setting), a GPS position is output whenever a DGPS signal is not available. Other options are DGPS Only (the receiver only outputs DGPS positions, when available) and DGPS Manual Off (the receiver will only calculate and output GPS positions, even when the differential signal is available).

DGPS Corr. Age

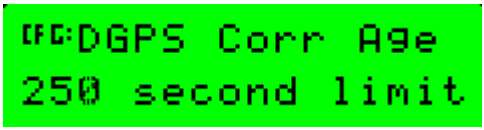


Figure 79: DGPS Correction Age

In the DGPS Corr Age screen, the maximum age a received differential signal will stay valid can be set. Valid range is 0 to 250 seconds, with 250 seconds being the default value. If the last received differential signal is older than the preset age limit, the 8200HP will revert to calculating and outputting a 'plain' GPS position.

EZ Sat

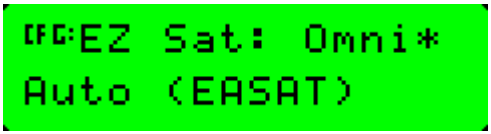


Figure 80: EZ Sat

The EZ Sat screen is used to easily select an OmniSTAR satellite. Instead of having to look up and enter satellite frequencies manually, just select the appropriate OmniSTAR satellite from a list or let the 8200HP search for the strongest available signal from the OmniSTAR satellites currently in view.
Default value is Auto. Other possible values are AFSAT, APSAT, EASAT, AMSAT, MSVW_, MSVC_, MSVE_ and OCSAT.

Satellite Frequency

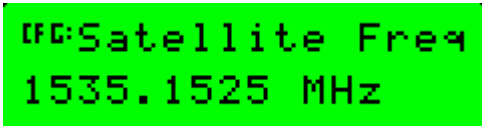


Figure 81: Satellite frequency

The satellite frequency screen can be used to manually enter the frequency of an L-band satellite broadcasting OmniSTAR differential corrections, for example when satellite frequencies have been changed while the 8200HP was switched off or a new satellite is not yet available in the EZ SAT list. Valid frequencies range from 1525.0000 to 1560.0000 MHz, in 0.0005 MHz increments.

Satellite Baud

Figure 82: Satellite baudrate

The Satellite Baud screen can be used in combination with the Satellite frequency screen, to set the baudrate of the selected satellite. Valid baudrates are 600, 1200 and 2400 baud. Default value for all OmniSTAR satellites is 1200 baud.

HP/XP Autoseed

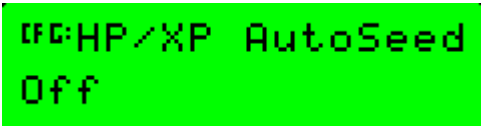


Figure 83: HP/XP Autoseed

When the 8200HP loses HP/XP lock, getting a new converged HP/XP position after regaining a lock can take quite some time. Seeding the receiver (i.e. input the approximate position and estimated position uncertainties) will reduce the time needed for HP/XP convergence considerably.

The 8200HP is capable of storing the last known position and position uncertainties, in case it loses HP/XP lock. When this happens, the last stored position can be used to seed the receiver in order to get a quick HP/XP convergence again. Default value for HP/XP AutoSeed is Off.
When HP/XP autoseed is switched on, the right hand side of the bottom line will display 'reset' in lower case. Selecting this text by pressing the key, the case can be toggled to upper case by pressing or . When 'RESET' is displayed in upper case and is pressed, the last stored position and position uncertainties are erased from receiver memory. This may be necessary when the receiver has been moved more than a few decimeters since HP/XP lock was lost.

HP/XP Init Mode

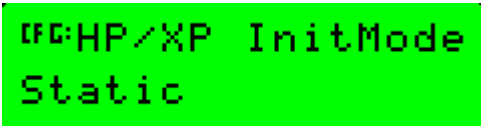


Figure 84: HP/XP Init mode

Keeping the 8200HP stationary in one place ('static') while waiting for the HP/XP solution to converge will reduce the time needed for convergence. If keeping the receiver stationary during HP/XP initialisation is not possible, set the HP/XP InitMode to 'Roving'. Failing to do so can result in very long HP/XP convergence times or no convergence at all.

HP/XP Converge

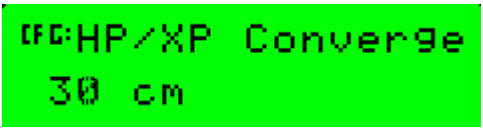


Figure 85: HP/XP Convergence limit

Using the HP/XP Converge screen, the convergence limit for an HP/XP solution can be set. The 8200HP will report a converged HP/XP position when the estimated position error is less than the value set in this screen. Default value is 30 cm / 12 inches. Possible values are 10 to 100 cm in 1 cm increments / 4 to 40 inches in 1 inch increments.

HP/XP Debug

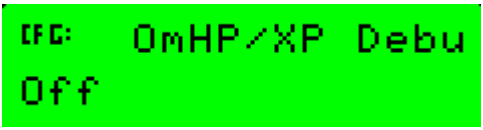


Figure 86: OmniSTAR HP/XP Debug Information screen

Using the HP/XP Debug screen, debug information can be output to one of the communication ports. Default value is Off (no debug information). When debug information is set to 'On', a second selection field appears in which the output port can be selected. Possible options are 'Port A', 'Port B' and 'Port C'.

Sub-menu: Port A Config

In the Port A Config menu, the following configuration items can be found. Items are listed in order, cycling through items can be done by pressing the or buttons. Selecting the item to change is done by pressing the button (repeatedly, if necessary). To confirm changes, press once. Most of the configuration items are also valid for Port B and Port C. These overlapping configuration items are only described once.

Port A In/Out

Figure 87: Port A I/O configuration settings

Using the I/O configuration screen, the communication protocols, speeds and settings can be configured. The 8200HP supports different input and output

baudrates and protocols over the same communication port. Default communication settings for port A are: input and output protocol TSIP (Binary Standard Interface Protocol) at 115 kbit/s, 8 databits, 1 stop bit, odd parity. Possible input protocols are TSIP, RTCM, TEXTA, TEXTB and None. Possible output protocols are TSIP, NMEA, RTCME, HAWK, OMNIHP and None. Communication speed (both input and output) may be set to 4800, 9600, 19k2, 38k4, 57k6 and 115k bit/s. Both protocol and communication speed for input and output can be configured independently. The number of databits (7 or 8), parity (odd, even or no parity) and stop bits (1 or 2) can not be set independently; set values are valid for both input and output signals.

The different input and output protocols are described in Table 5 and Table 6.

Protocol	Description
TSIP	The receiver can accept TSIP data packets from the port, for example when remotely controlling the receiver.
RTCM	The receiver can accept RTCM data from an external DGPS device.
TEXTA	The receiver can accept ASCII data from an external device (for example an external sensor) on port B, merge it with NMEA GPS data and output the combined data on Port A (Message: $PTNLAG001,<up to 66 ASCII characters>*CK<CR><LF>). The incoming data must be limited to 66 ASCII characters and terminated by a carriage return and line feed (hex characters 0x0D 0x0A). For the receiver to output the combined NMEA string, NMEA must be selected as the output protocol on Port A.
TEXTB	See the description for the TEXTA setting (above).
None	Inputs nothing to the receiver

Table 5: 8200HP input protocols

Protocol	Description
TSIP	The receiver can output TSIP data packets to the port, for example when being controlled remotely.
NMEA	The receiver outputs NMEA messages to the port, to be used by other equipment in need of GPS data. Type and output rate of the NMEA messages can be set using the NMEA messages screens, described further on in this manual.
RTCME	The receiver outputs RTCM messages to the port, to be used by other GPS receivers in need of differential GPS corrections.
HAWK	The receiver outputs HAWK messages to the port.
OMNIHP	The receiver ouputs OMNIHP messages to the port.
None	Outputs nothing from the receiver

Table 6: 8200HP output protocols

Port A Out RTS/CTS

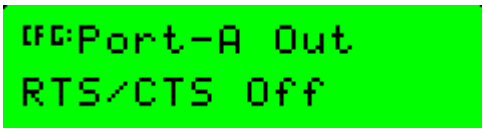


Figure 88: Port-A Modem control options

The RTS/CTS screen can be used to toggle between using or not using the RTS and CTS signals through the communication port. Some external devices, like modems, need RTS and CTS signals for their correct functioning. Default, RTS/CTS is disabled (off). When either port A or Port B is set to RTS/CTS On, the *receiver options* status screen, sub-screen *modem control* (see page 31 of this manual) will show 'Modem Ctl(A) On'.

NMEA1 Messages

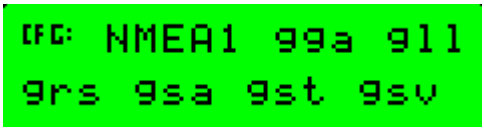


Figure 89: NMEA messages 1

The NMEA messages screens are used to control the NMEA output of the 8200HP. Messages set in lower case are not output, messages set in upper case are output when the output protocol is set to NMEA. The 8200HP is capable of outputting a number of NMEA messages, that may not all be needed as inputs for the attached device. Furthermore, the number of NMEA messages that can be sent by the 8200HP also depends on the baudrate of the communication port and the set output rate of the NMEA messages.

For example: Selecting GGA, GSV and RMC to be output at a 5 Hz. output rate, with an average of 8 satellites in view (so 2 GSV messages for every GGA message), the baudrate (bits per second) can be calculated as follows:

1 GGA-message = 89 bytes * (8+1) bits/byte =	801 bits
2 GSV messages = 2*72 bytes * (8+1) bits/byte =	1296 bits
1 RMC message = 77 bytes * (8+1) bits/byte =	693 bits
Total	2790 bits

5 Hz. output = 5 * 2790 = 13950 bits/sec.

In the above example, the baudrate should be set to the next higher standard baudrate, which is 19,200, to prevent a buffer overflow of the COM-port.

Warning: The above calculation is indicative, based on an average message length count. Actual values may differ, yielding different outcomes.

Warning: The initial NMEA standard called for a baud rate of only 4800. As a result, many external devices are still set to communicate with a GPS receiver at 4800 baud. This is an average of only 6 NMEA messages per second. Therefore, be aware not to select too many NMEA messages or a very high output rate for NMEA output, unless you have set the baudrate on both the communication port of the 8200HP and the communication port of the external device to a (much) higher value first.

NMEA2 Messages

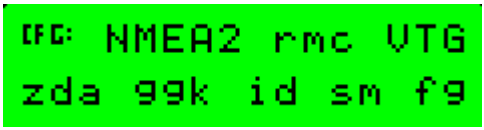


Figure 90: NMEA messages 2

The second NMEA messages screen is essentially the same as the first, only different messages can be selected.

NMEA3 Messages

Figure 91: NMEA messages 3

The third NMEA messages screen is also equivalent to the first and second one, again presenting more different messages to be selected for output.

NMEA/TSIP Output Rate

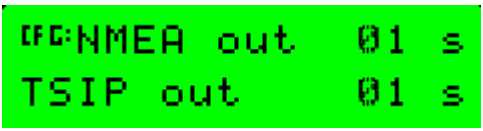


Figure 92: NMEA/TSIP output rates

Using the NMEA/TSIP output rates screen, it is possible to increase the time between two subsequent NMEA or TSIP message bursts. Possible values are 01 to 99, in increments of 1. Default value is 1 second for both NMEA and TSIP output rates.

To change the output rate to faster than once every second, the position rate (see page 38) must be set to 5 or 10 Hz. first. After changing the position rate, the NMEA and/or TSIP output rate can be set to 'ASAP'. NMEA and/or TSIP messages will then be output 5 or 10 times a second. The actual output rate and actual number of messages that can be output at a certain output rate depends on the baudrate settings of the communication port.

1 Hz NMEA

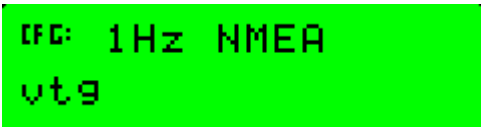


Figure 93: 1Hz NMEA message output

Some NMEA messages change relatively slow, so to output such a message faster than once per second would at best only be a waste of bandwidth. The 1Hz NMEA message output screen shows the messages that can be selected to output at a 1 Hz. rate, regardless of the NMEA output rate set in the NMEA/TSIP output rates screen. Messages displayed in upper case are output at a 1 Hz rate, messages displayed in lower case are not. The current

versions of the 8200HP firmware only support setting the VTG message to 1 Hz.

NMEA Quality

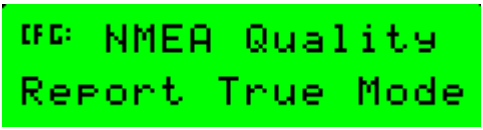


Figure 94: NMEA Quality configuration

The NMEA GGA message is used to provide information about the quality of the (D)GPS solution. Possible values are listed in Table 7.

Value	Description
0	No GPS
1	GPS SPS
2	DGPS
4	RTK
5	Float

Table 7: (D)GPS quality indicators

In 'Report True Mode', a converged HP/XP solution is reported as RTK (4), an unconverged HP/XP solution is reported as Float (5). Since some software packages do not know how to handle GPS quality indicators other than 0, 1 and 2, 'Limit at DGPS' mode will limit the GPS quality output to 0, 1 or 2, even if the solution is a converged or unconverged HP/XP solution.

Sub-menu: Port B Config
The Port B configuration menu is similar to the Port A configuration menu. The only difference is the first menu item, which is displayed below.

Port B In/Out

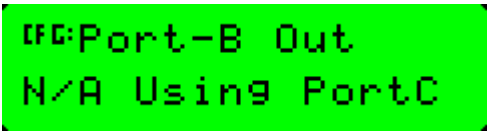


Figure 95: Port B I/O configuration settings

Although the 8200HP features three communication ports, there are only two physical communication ports on the receiver back panel. In order to be able to use all three communication ports, port B and port C are both connected to physical power/data port B of the receiver. By default, Port C is set active to

use the physical power/data port, leaving Port B unavailable for communication, as shown in Figure 95.

Sub-menu: Port C Config

The Port C configuration menu is similar to the Port A and Port B configuration menu, although there are two differences. The first difference is only a difference in menu order; the first and second menu items have changed places, so the first menu item of the Port C configuration menu is the Port C Out screen and the second menu item is the Port C In/Out configuration setting screen. The second difference can be found in the Port C Out screen itself as displayed in Figure 96.

Port C Out

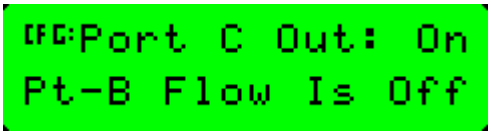


Figure 96: Port C Out screen

Port C cannot be configured to use RTS and CTS signals for modem control. The port C out configuration screen is used to enable port C output (and with it disable port B output) instead. When port C output is set active ('On'), port B output will automatically be disabled ('Pt-B Flow Is Off') and vice versa.

Sub-menu: CAN A Config

The 8200HP is capable of communicating using the CAN (Controller Area Network) protocol. The CAN-bus is specifically designed to be robust in electomagnetically noisy environments. Although it was initially designed for the connection of electronic control units (ECUs) in the automotive industry, it is ever more being used in embedded control applications where the risk of a noisy communication path is high.

In the CAN A Config menu, the following configuration items can be found. Items are listed in order, cycling through items can be done by pressing the or buttons. Selecting the item to change is done by pressing the button (repeatedly, if necessary). To confirm changes, press once. All of the configuration items are also valid for Port B and are therefore only described once.

CAN Baud

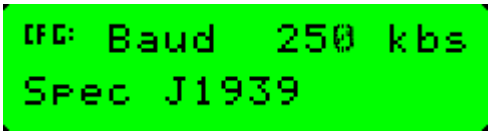


Figure 97: CAN-bus baudrate setting

The maximum reliable communication speed over the CAN bus depends on the length of the cable forming the bus. Using the CAN baud screen, the communication speed over the CAN bus can be configured. Possible options are 125, 250, 500 and 850 kbit/s, with a default value of 250 kbit/s. The J1939 (non-configurable item) indicates the CAN bus protocol variant being used: a high-speed (up to 1 Mbit/s) protocol using extended length messages.

CAN Address

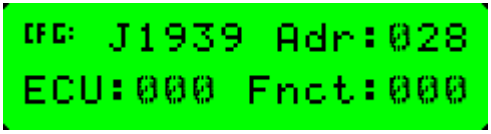


Figure 98: CAN-bus address setting

Because the CAN-bus allows multiple talkers and multiple listeners, each separate unit must have a unique hardware address to be able to identify the source of a message on the bus and to address a certain unit over the bus. Using the CAN Address screen, the CAN address (Adr) can be set between 000 and 253 (default address is 028). Both the ECU and Fnct can be set between 000 and 255 (default value for both is 000).

CAN Messages

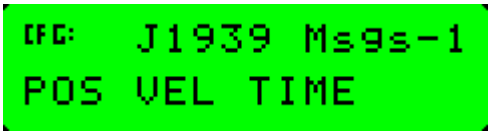


Figure 99: CAN-bus messages

The CAN messages screen is used to control the output messages from the receiver. Messages displayed in upper case are output, messages displayed in lower case are not. Default, all three J1939 messages are active.

CAN Msg Rate

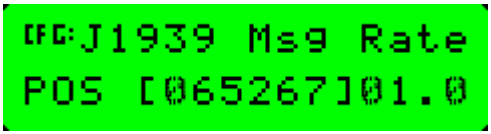


Figure 100: CAN-bus message rates

The CAN Msg Rate configuration controls the message rate of each message output to the CAN bus. The message rate can be set from 0.2 to 65.4 in 0.2 increments. The message rate indicates the time between two subsequent messages of the same type. Default setting for POS, TIME and VEL is 01.0, i.e. 1 Hz output.

NMEA 2000 Messages 1

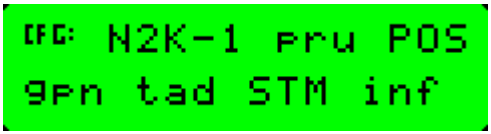


Figure 101: NMEA 2000 messages 1

The NMEA 2000 Messages screens are used to control the NMEA 2000 message outputs to the CAN bus. Messages displayed in upper case are output, messages displayed in lower case are not. Default, only the POS and STM messages are output.

NMEA 2000 Messages 2

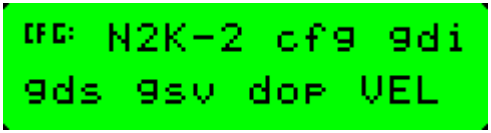


Figure 102: NMEA 2000 messages 2

The NMEA 2000 messages 2 screen is similar to the NMEA 2000 messages 1 screen, only controlling different messages to be output.

NMEA 2000 Msg Rate

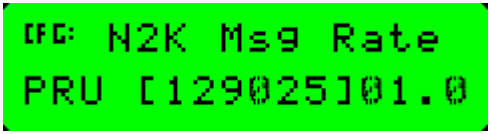


Figure 103: NMEA 2000 message rates

The NMEA 2000 Msg Rate configuration controls the message rate of each NMEA 2000 message output to the CAN bus. It is similar to the CAN bus message rates configuration. The default message rates of the different NMEA 2000 messages are listed in Table 8.

Message	Default message rate
PRU	01.0
VEL	01.0
DOP	01.0
GSV	05.0
GDS	01.0
GDI	05.0
CFG	05.0
INF	60.0
STM	05.0
TAD	01.0
GPN	05.0
POS	01.0

Table 8: NMEA 2000 default message rates

TPCAN Protos

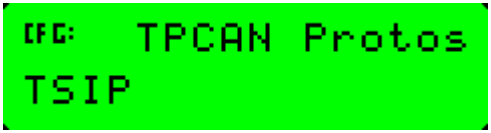


Figure 104: TPCAN protos

The TPCAN Protos screen is used to control the use of TSIP over the CAN bus. Default, TSIP over the CAN bus is enabled.

Self CFG Address

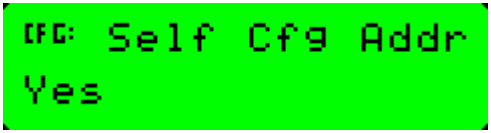


Figure 105: CAN-bus self-configured address

Devices on a CAN bus can be configured to either get an address automatically, or try to use a preset address and revert to another address should the preset address already exist on the bus. Default is trying to use the preset address.

Appendix A

Technical Specifications

Performance

Position Accuracy [1]	VBS:	0.78 m 2DRMS
	HP:	0.10 m 2DRMS
	XP:	0.20 m 2DRMS
Reacquisition	<5 s L1 (typical)	
	<5 s L2 (typical)	
Data Rates	1, 5, 10 Hz	
Time Accuracy [1 2]	20 ns RMS	
Velocity Accuracy	0.05 m/s RMS	
Dynamics	Vibration	4 G (sustained tracking)
	Maximum Velocity	515 m/s [3]
	Maximum Height	18.288 m [3]

Environmental

Operating Temperature	-30°C to +70°C
Storage Temperature	-40°C to +85°C
Humidity	Not to exceed 95% non-condensing

[1] Typical values. Performance specifications are subject to GPS system characteristics, U.S. DOD operational degradation, ionospheric and tropospheric conditions, satellite geometry, baseline length and multipath effects.

[2] Time accuracy does not include biases due to RF or antenna delay.

[3] In accordance with export licensing.

Power requirements	
Voltage	+10 to +32 VDC
Power consumption	4.2 W (typical)
RF input / LNA power output	
Antenna connector	TNC female, 50 Ω nominal impedance
RF Input Frequencies	1575.42 MHz (L1), 1227.60 MHz (L2), 1525 MHz – 1559 MHz (L-Band)
LNA Power	+ 9 VDC
Input / output data interface	
Electrical Format	RS232 / CAN 2.0B
Bit Rate[1]	4800, 9600, 19200, 38400, 57600, 115200 bps
Lead input	CTS and DTR
Lead output	RTS and PPS
Signals Supported	TX, RX, RTS, CTS, DTR, PPS
Input / output connectors	
A	Power/Data port A
B	Power/Data port B/C
Ant	Antenna
Physical dimensions	
Size	147.8 (w) x 55.8 (h) x 215.9 mm (d)
Weight	1.05 kg

[1] Most external hardware using GPS NMEA-messages is set to use 4800 bps, 8 databits, 1 stopbit and no parity (8N1).

Receiver Connector Pin No.	Signal Name	Signal Description
1	Event In	External event input
2	TXD	RS-232 transmit
3	RXD	RS-232 receive
4	NC	
5	GND	Signal ground
6	RTS	RS-232 RTS
7	PWR ON[1]	Receiver power on
8	CTS	RS-232 CTS
9	NC	
10	V+ In	Positive voltage lead
11	V- In	Negative voltage lead
12	PPS	1 PPS output

Table 9: 8200HP Power/data Port Pin-Out Descriptions (both port A and B)

[1] Pins 7 and 10 of Port A are jumpered with a 5 kOhm, 5% resistor.

Appendix B

NMEA 0183 Message Options

The OmniSTAR 8200HP is configured to output 4 NMEA 0183 sentences (GGA, GSA, RMC and VTG) by default. Sentences can be added or removed by the user using the NMEA configuration screens (see page 45). The default output rate is set to 1 Hz, but 5 and 10 Hz may also be selected. Apart from the 'common' NMEA messages (starting with $GP), some proprietary vendor-specific messages (starting with $PTNL or $PFUG) can be selected for output.

Default	Message Sentence	Description
*	GGA	GPS Fix Data
	GLL	Position Data
	GRS	GPS Range Residuals
*	GSA	GPS DOP and Active Satellites
	GST	GPS Pseudorange Noise Statistics
	GSV	GPS Satellites in View
	MSS	Beacon Receiver Signal Status
	PTNLDG	DGPS Receiver Status
	PTNLEV	Event Marker
	PTNL,GGK	Time, Position, Position type, DOP
	PTNLID	Receiver ID
	PTNLSM	RTCM special message
*	RMC	Recommended Minimum Specific GPS Data
*	VTG	Track Made Good and Ground Speed
	ZDA	Time and Date

Table 10: NMEA 0183 messages available for the 8200HP

NMEA 0183 Message Formats

In this section each message is described in more detail.

GGA – GPS Fix Data

The GGA message includes time, position and fix related data for the GPS receiver.

$GPGGA,hhmmss.ss,ddmm.mmmmm,D,dddmm.mmmmm,D,Q,sv,H.H,h.hh,M,h.hh,M,A.AA,DRID*XX

Field Number	Description
1	UTC of Position fix
2,3	Latitude in DDMM,MMMM, N (North) or S (South). [1]
4,5	Longitude in DDDMM,MMMM format, E(East) or W (West). [1]
6	GPS Quality Indicator: 0=No GPS, 1=GPS, 2=DGPS (VBS), 4=HP/XP (fixed), 5=HP/XP (float).
7	Number of Satellites in Use.
8	Horizontal Dilution of Precision (HDOP).
9,10	Height above Mean Sea level in Meters, M = Meters.
11,12	Geodial Separation in Meters, M = Meters. [2]
13	Age of Differential GPS Data. [3]
14	Differential Reference Station ID (0000 – 1023) [4]

Table 11: Description of the GGA message.

NOTES:

1. The GGA message provides 8 decimal places. In non-differential mode, only the first four decimals are relevant. In (VBS) differential mode, the first five decimals are relevant. In HP/XP mode, the first seven decimals are relevant.
2. Geodial Separation is the difference between the WGS-84 earth ellipsoid and mean-sea-level (MSL).
3. Time in seconds since the last OmniSTAR correction update.
4. For OmniSTAR, reference station ID 0100 = VBS, 1000 = HP, 1008 = XP, 1016 = HP+XP.

GLL - Geographic Position – Latitude/Longitude

The GLL message contains the latitude and longitude of the present position, the time of the position fix and its status.

$GPGLL,ddmm.mmmmmmm,D,dddmm.mmmmmmm,D,hhmmss.ss,A*XX

Field Number	Description
1,2	Latitude, N (North) or S (South).
3,4	Longitude, E (East) or W (West).
5	UTC of Position.
6	Status: A = Valid, V = Invalid.

Table 12: Description of the GLL message.

GRS – GPS Range Residuals

The GRS message is used to support the Receiver Autonomous Integrity Monitoring (RAIM).

$GPGRS,hhmmss.ss,R,r.r,r.r,r.r,r.r,r.r,r.r,r.r,r.r,r.r,r.r,r.r,r.r,r.r,r.r,r.r,*XX

Field Number	Description
1	UTC time of GGA position fix
2	Residuals 0: Residuals used to calculate position given in the matching GGA line 1: Residuals recomputed after the GGA position was computed
3 to 14	Range residuals for satellites used in the navigation solution, in meters

Table 13: Description of the GRS message.

NOTES:

* Because the contents of this NMEA message do not change significantly during a 1-second interval, the receiver outputs this message at a maximum rate of 1 Hz.
* When running in HP or XP mode this NMEA message is not valid.

GSA – GPS DOP and Active Satellites

The GSA message indicates the GPS receivers operating mode and lists the satellites used for navigation and the DOP values of the position solution.

$GPGSA,m,f,sv,sv,sv,sv,sv,sv,sv,sv,sv,sv,sv,sv,P.P,H.H,V.V*XX

Field Number	Description
1	Mode: M = Manual, A = Automatic.
2	Current Mode 1 = Fix not available, 2 = 2D fix, 3 = 3D fix.
3 to 14	PRN numbers of the satellites used in the position solution. *
15	Position Dilution of Precision (PDOP).
16	Horizontal Dilution of Precision (HDOP).
17	Vertical Dilution of Precision (VDOP)

Table 14: Description of the GSA message.

NOTE:

* When less than 12 satellites are used, the unused fields are null.

GST – GPS Pseudorange Noise Statistics

The GST message is used to support Receiver Autonomous Integrity Monitoring (RAIM).

$GPGST,hhmmss.ss,S.S,M.M,m.m,ddd.d,y.y,x.x,h.h,*XX

Field Number	Description
1	UTC time of GGA fix
2	RMS value of the standard deviation of the range inputs to the navigation process (range inputs include pseudoranges and DGPS corrections)
3	Standard deviation of semi-major axis of error ellipse, in meters
4	Standard deviation of semi-minor axis of error ellipse, in meters
5	Orientation of semi-major axis of error ellipse, in degrees from true north
6	Standard deviation of latitude error, in meters
7	Standard deviation of longitude error, in meters
8	Standard deviation of altitude error, in meters

Table 15: Description of the GST message.

NOTE:

* Because the contents of this NMEA message do not change significantly during a 1-second interval, the receiver outputs this message at a maximum rate of 1 Hz.

GSV – GPS Satellites in View

The GSV message identifies the number of SVs in view, the PRN numbers, elevation, azimuth and SNR values.

$GPGSV,M,S,T,sv,el,azm,snr,sv,el,azm,snr,sv,el,azm,snr,sv,el,azm,snr*XX

Field Number	Description
1	Total number of sentences of this type in this cycle
2	Sentence number
3	Total number of SVs visible
4	SV PRN number
5	Elevation in degrees, 90° maximum
6	Azimuth, degrees from true north, 000° to 359°
7	SNR, 00-99 dB (null when not tracking)
8-11	Information about second SV, same format as fields 4-7
12-15	Information about third SV, same format as fields 4-7
16-19	Information about fourth SV, same format as fields 4-7

Table 16: Description of the GSV message.

NOTE:

* Because the contents of this NMEA message do not change significantly during a 1-second interval, the receiver outputs this message at a maximum rate of 1 Hz.

MSS – Beacon Receiver Signal Status

The MSS message identifies the status of the beacon signal, including the beacon signal strength, beacon signal-to-noise ratio (SNR), beacon frequency and beacon bit rate.

$GPMSS,SS.S,ss.s,fff.f,bbb,c*XX

Field Number	Description
1	Signal strength (SS), dB ref: 1 µV/m
2	Signal-to-Noise Ratio (SNR), dB
3	Beacon frequency, 283.5-325.0 kHz
4	Beacon bit rate (25, 50, 100, 200), bits/sec.
5	Channel number

Table 17: Description of the MSS message.

NOTE:

* Because the contents of this NMEA message do not change significantly during a 1-second interval, the receiver outputs this message at a maximum rate of 1 Hz.

PTNLSM – Proprietary (RTCM Special)

The PTNLSM message is a proprietary message for identifying the Reference Station ID and the ASCII Text message that is included in an RTCM Type 16 Special Message. The PTNLSM message is generated anytime an RTCM stream receives a valid Type 16 Special Message.

$PTNLMS,ssss,ASCII Text Message,*XX

Field Number	Description
1	Reference station ID number, ranging from 0 to 1023. Leading zeroes must be added to fill the four-digit field.
2	ASCII text message contained within the Type 16 RTCM message.

Table 18: Description of the PTNLSM message.

PTNLEV – Proprietary (Event Marker)

The PTNLEV message is a proprietary message for time-tagging and marking when an event input occurs. If enabled, this event message is output whenever an event is detected.

$PTNLEV,hhmmss.ss,N*XX

Field Number	Description
1	Time: UTC time of the position fix in hhmmss.ss format
2	Event number, starting with event 0

Table 19: Description of the PTNLEV message.

PTNLID – Proprietary (Receiver ID)

The PTNLID message is a proprietary message for time-tagging and marking when an event input occurs. If enabled, this event message is output whenever an event is detected.

$PTNLID,MMM,PP,FFF,fff,dd/mm/yy*XX

Field Number	Description
1	Machine ID
2	Product ID
3	Major firmware release number
4	Minor firmware release number
5	Firmware release date, in dd/mm/yy format

Table 20: Description of the PTNLID message.

NOTE:
* The PTNLID message, if enabled, is output once every 30 seconds.

PTNLDG – Proprietary (DGPS Receiver Status)

The PTNLDG message is a proprietary message for identifying the DGPS receiver channel strength, channel SNR, channel frequency, channel bit rate, channel number, channel tracking status, RTCM source and channel performance indicator for either beacon DGPS or satellite DGPS.

$PTNLDG,SS.S,s.s,fffffff.f,bbbb,ch,ts,R,PI,,,*XX

Field Number	Description
1	Channel signal strength, in 1 dBµV/m. For satellite, this is the ADC input voltage level. For beacon, this is the electromagnetic field intensity level.
2	Channel signal to noise (SNR) level, in dB
3	Channel frequency, in kHz.
4	Channel bit rate, in bits per second (bps)
5	Channel number (0-99)
6	Channel tracking status 0: Channel idle 1: Wideband FFT search 2: Searching for signal 3: Channel has acquired signal 4: Channel has locked on signal 5: Channel disabled
7	Specified channel is used as RTCM source 0: Not used 1: Used
8	Channel tracking performance indicator. For satellite, this is the time since last sync, in tenths of seconds ranging from 0-255. For beacon, this is the number of errors in the last 255 words.

Table 21: Description of the PTNLDG message.

NOTES:

- The PTNLDG message fields are defined in free format.
- Leading zeroes in a field are omitted (for example, channel bitrate 25 bps is displayed as xxx,**25**,xxx instead of xxx,**00025**,xxx).
- If a channel is disabled, the channel fields can be null fields (showing commas only). If more than one channel is available, the message should be repeated for each channel.
- Because the contents of this NMEA message do not change significantly during a 1-second interval, the receiver outputs this message at a maximum rate of 1 Hz.

PTNL,GGK – Time, Position, Position Type, DOP

The PTNL,GGK message is a proprietary message containing time, position, position type and DOP.

$PTNL,GGK,hhmmss.ss,mmddyy,ddmm.mmmmmm,D,dddmm.mmmmmm,D,Q,sv,P.P,EHTh.hhh,M*XX

Field Number	Description
1	UTC of position fix, in hhmmss.ss format
2	UTC Date of position in mmddyy format
3	Latitude in ddmm.mmmmmmm format
4	Direction of latitude (N: North, S: South)
5	Longitude in dddmm.mmmmmmm format
6	Direction of longitude (E: East, W: West)
7	GPS quality indicator 0: fix not available or invalid 1: Autonomous GPS fix 3: Differential, code+carrier phase (RTK) solution 4: Differential, code phase only (DGPS) solution
8	Number of satellites used in GPS solution
9	DOP of fix
10	Ellipsoidal height of fix (antenna height above ellipsoid)
11	M: Ellipsoidal height is measured in meters

Table 22: Description of the PTNL,GGK message.

RMC – Recommended Minimum Specific GPS Data

The RMC message identifies the UTC time, status, latitude, longitude, speed over ground (SOG), date and magnetic variation of the position fix.

$GPRMC,hhmmss.ss,A,ddmm.mmmmm,D,dddmm.mmmmm,D,sss.ss,T.T,DDMMYY,mm.m,E*7C

Field Number	Description
1	Time: UTC time of the position fix in hhmmss.ss format
2	Status A: Valid V: Navigation Receiver Warning (V is output whenever the receiver suspects something is wrong)
3	Latitude coordinate. The number of decimal places, 0-7, is programmable and determined by the numeric precision selected in TSIP Talker for a RMC message.
4	Latitude direction: N = North, S = South
5	Longitude coordinate. The number of decimal places, 0-7, is programmable and determined by the numeric precision selected in TSIP Talker for a RMC message.
6	Longitude direction: W = West, E = East
7	Speed Over Ground (SOG) in knots (0-3 decimal places)
8	Track Made Good, True, in degrees
9	Date in dd/mm/yy format
10	Magnetic Variation in degrees
11	Direction of magnetic variation E: Easterly variation from True course (subtracts from True course) W: Westerly variation from True course (adds to True course)
12	Mode Indication A: Autonomous D: Differential N: Data not valid

Table 23: Description of the RMC message.

VTG – Course Over Ground and Ground Speed

The VTG (Velocity True Ground) message identifies the actual track made good and speed over ground.

$GPVTG,t,T,,,n.nn,N,k.kk,K

Field Number	Description
1	Track made good
2	Fixed text 'T' shows that track made good is relative to true north
3	Not used
4	Not used
5	Speed over ground in knots (0-3 decimal places)
6	Fixed text 'N' shows that speed over ground is in knots
7	Speed over ground in kilometers/hour (0-3 decimal places)
8	Fixed text 'K' shows that speed over ground is in kilometers/hour

Table 24: Description of the VTG message.

NOTE:

* Because the contents of this NMEA message do not change significantly during a 1-second interval, the receiver outputs this message at a maximum rate of 1 Hz.

ZDA – Time and Date

The ZDA message contains UTC, the day, the month and the year of the local time zone.

$GPZDA,hhmmss.ss,DD,MM,YYYY,lh,lm

Field Number	Description
1	UTC.
2	Day (0 – 31).
3	Month (0 – 12).
4	Year.
5	Local Zone Description Hours (± 13 Hours). *
6	Local Zone Description Minutes.

Table 25: Description of the ZDA message.

NOTES:

* Local zone description is the number of whole hours added to local time to obtain UTC. The zone description is always negative for eastern longitudes.
* Because the contents of this NMEA message do not change significantly during a 1-second interval, the receiver outputs this message at a maximum rate of 1 Hz.

Appendix C

Acronyms used in this manual

1PPS	One Pulse Per Second
2D	Two Dimensional
3D	Three Dimensional
ASCII	American Standard Code for Information Interchange
BPS	Bits per Second
CEMF	Counter Electro-magnetic Force
dB	Decibel
DGPS	Differential Global Positioning System
DOP	Dilution of Precision
EGNOS	European Geostationary Navigation Overlay Service
GPS	Global Positioning System
HP	High Performance
LCD	Liquid Crystal Display
LNA	Low Noise Amplifier
NCC	Network Control Centre
NMEA	National Marine Electronics Association (Standard for interfacing marine electronic devices)
MSAS	MTSAT Satellite based Augmentation System
RF	Radio Frequency
RTCM	Radio Technical Commission Maritime
VBS	Virtual Base Station
WAAS	Wide Area Augmentation System
XP	Extended Performance

Appendix D

Updating the 8200HP firmware

In order to update the 8200HP firmware, an MS-Windows compatible computer (either desktop or laptop) and the flashloader 200 program are required. The 8200HP has to be connected to a communication port of the computer and has to be switched on. The update process does not require reception of either GPS or OmniSTAR satellite signals. During the update process, do not switch off either the computer or the 8200HP receiver and do not disconnect the 8200HP from the computer.

After installing and starting the flashloader 200 program, the following screen will show.

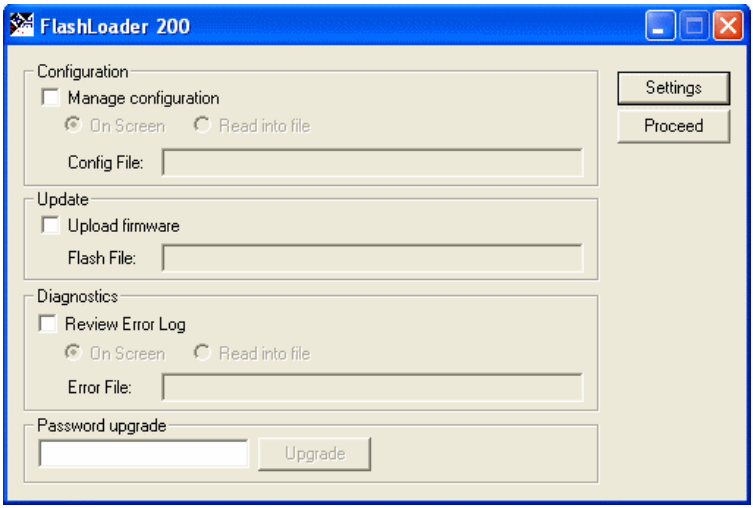


Figure 106: Flashloader main screen

In the 'Update' field, check the 'Upload firmware' box. An explorer screen will open in which the desired image file can be selected. (see Figure 107). Select the appropriate image file and click the 'Open' button once. The name of the selected image file, including its complete location on your computer, will now be displayed in the grey textbox after 'Flash File:'. Click the 'Proceed' button once to proceed with the update process.

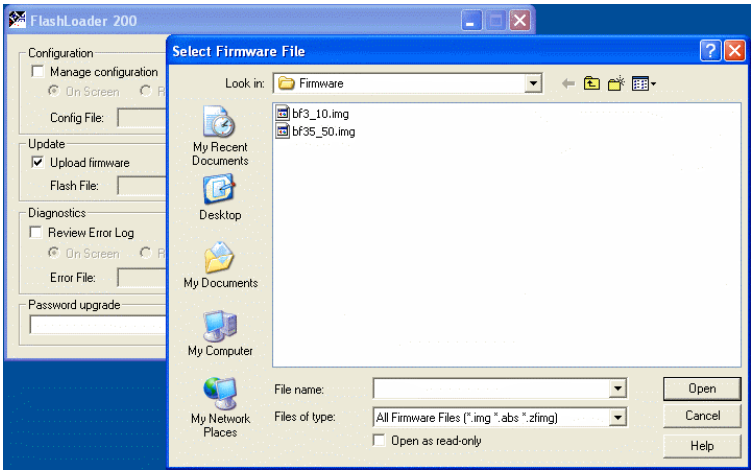


Figure 107: Firmware image selection screen

The program will start searching for a compatible receiver to upload the firmware to. This will normally not take more than 15-20 seconds.

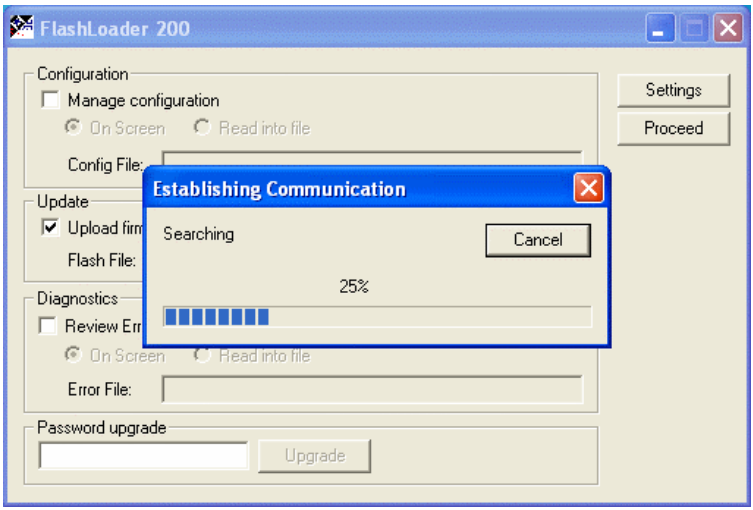


Figure 108: Establishing communication with the receiver

After the program has finished searching for compatible receivers, it will show a list of receivers and the computer communication ports they are connected to. (see Figure 109).

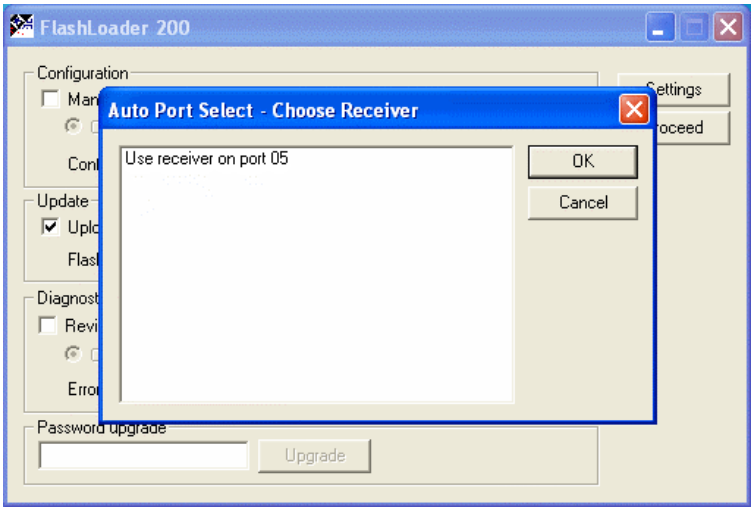
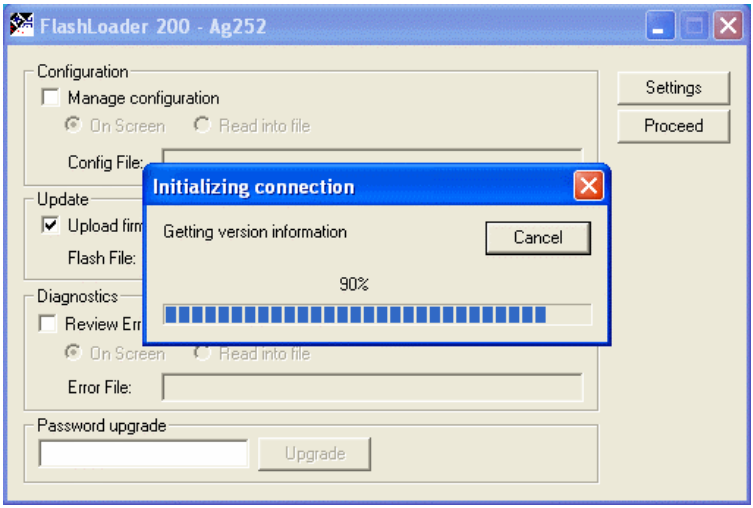


Figure 109: Receiver selection screen

Select the receiver to update and click the 'OK' button once. The program will now connect to the receiver and collect some information from it.



When the program has found the receiver to be compatible with the selected firmware, it will start to upload the firmware to the receiver (see Figure 110).

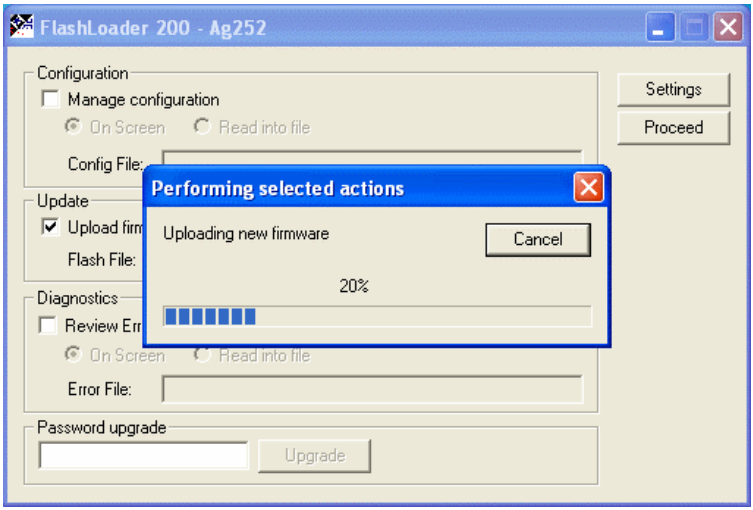


Figure 110: Uploading firmware screen

After the firmware upload is completed, the 8200HP's program space will be erased (Figure 111), so the new firmware can be programmed (Figure 112).

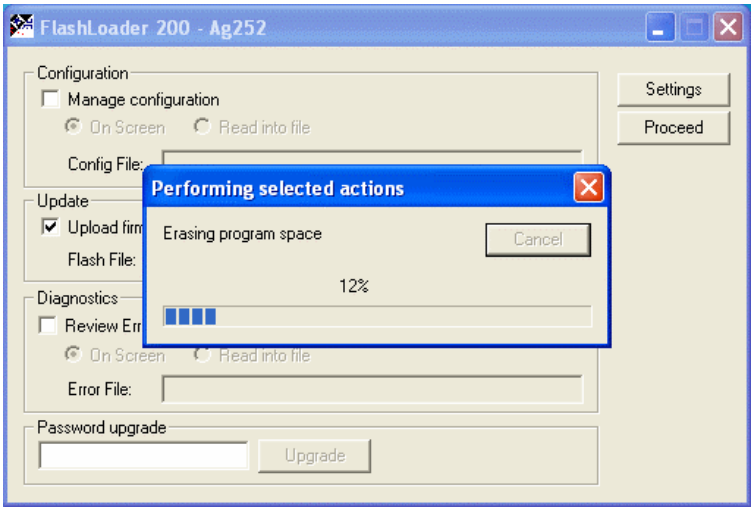


Figure 111: Erasing program space screen

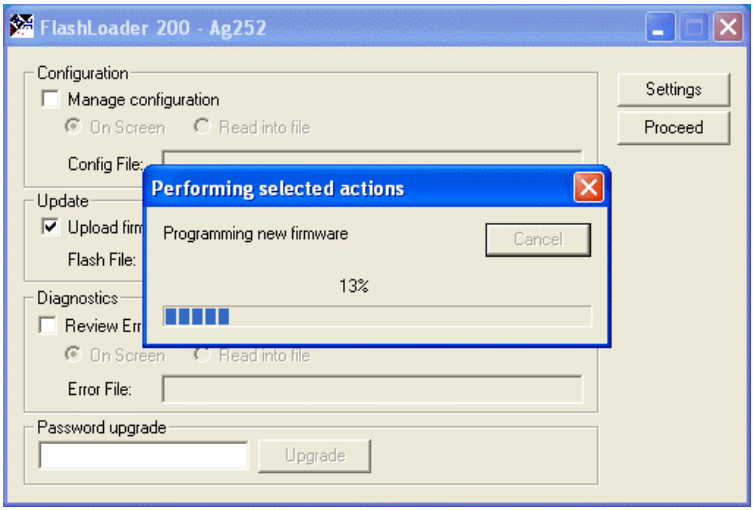


Figure 112: Programming new firmware screen

After programming the new firmware, the Flashloader program will report the flashing completed successfully. The updated 8200HP is now ready to use.

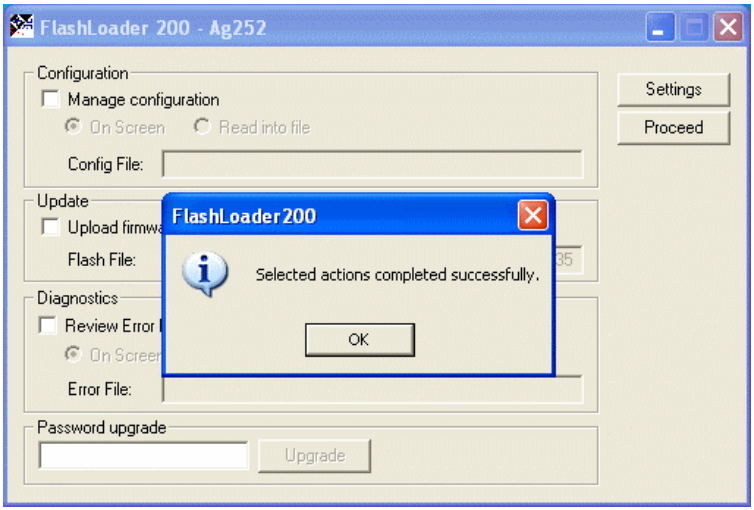


Figure 113: Flashing completed successfully

Appendix E

OmniSTAR reference stations

For its satellite based DGPS service, OmniSTAR uses correction data from a number of reference stations distributed all over the globe. The most recent map can be found on the internet: See http://www.surveyplanner.com

Appendix F

Receiver Service Procedure

If an OmniSTAR receiver unit fails to perform, contact the OmniSTAR office within the region, after following the procedural checks. We wish to hear about frequently experienced problems and your assistance will help by copying the form on the next page, filling in the details requested and faxing or mailing the form to the OmniSTAR office for on-forwarding to Product Marketing.

The most common problems are interfacing, and usually occur at installation time. If you have an interfacing connection not covered in this manual we would like to assist you and produce another technical bulletin that may assist other users in the future.

If a problem appears that you think may be caused by a system performance problem, contact the OmniSTAR office in your region for any system aberrations that may have been experienced.

We are sensitive to our customers' needs and we want to assure specified system performance at all times. There could, however, be situations where conditions are below par, such as fringe area operations, radio communication disturbance etc., and, as OmniSTAR receiver monitors the system performance continuously, these conditions would be noted.

Appendix G

OmniSTAR Receiver Problem Report Form

Please copy this form and report problem with as much detail as possible.

Problem with: **Signal Y/N** **Manual Y/N** **OmniSTAR Y/N** **Receiver Y/N**	**Date:**
Description of problem:	
Person Reporting:	**Contact Phone #:**
Model #:	**Serial #:**
Customer Name:	**Customer Address:**
Customer Phone #:	
Date purchased: / /	**Dealer:**
GPS Receiver used:	**Serial #:**
Area of operations:	
Symptoms from display (if any):	

User Notes